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THE AMERICAN ARCHITECT AND BUILDING NEWS

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As usual the close of the year has brought us into close communication with our subscribers, and we have taken note of all the complaints, suggestions and compliments that have reached us, and hope that the makers of them will be satisfied with such action as we may be able to take. The compliments are such as any reasonably well-conducted journal receives at this time of year, and the suggestions are of more or less practical value, while the complaints to a certain extent recoil on the makers. Until we became case-hardened through familiarity with the assertion, we used to be not a little chagrined at the bluntness with which even the most personally friendly of our subscribers told us that "we do not care for the reading-matter," "we never bind it up at the end of the year," "all we care for are the illustrations;" but at last we have come to understand that the journal consists of two distinct features, for one of which — the less valuable — the text, the editors are solely responsible; while for the other and more valuable, the illustrations, they are responsible in only a secondary degree. Therefore all complaints directed against this feature should be borne in part at least by those who are primarily responsible for their occasion — the contributing architects. If the illustrations we publish are not satisfactory to a given subscriber, it rests with him to offer us such as he would like to have appear in our pages; he has our cordial invitation to do so.

For the sake of the point we wish to make we will grant that the illustrations are all or the most important part of what our subscribers wish to secure in return for their subscription money, and that the complaints of the shortcomings of the journal in this respect are justifiable; and after looking over the illustrations we have published during the past year, we are obliged to confess that as an exposition of current American architecture it is wofully incomplete, the elements of dignity and lofty architectural achievement being minus quantities to an unwarrantable extent. The cause of this deficiency is not that dignity is not attained in this country, nor is it that our architects have less frequent occasion to practise their highest efforts than European architects: the opportunities and possibilities that the public and private wealth open to the profession are certainly as great here as elsewhere, and by hearsay and ocular evidence we know that there are men who are worthily acquitting themselves of the tasks imposed on them. But from our inability to obtain illustrations of these works we are unwillingly obliged to convey to our readers in all parts of the world the idea that our architects are mainly engaged in designing country-houses — pretty enough, and vastly superior to the average of the work we laid before our readers in the early days of the journal — but that our cities, with their costly dwellings, hotels, stores, apartment-houses and public buildings, Topsy-like, "growed." In short, the best work of a large number of the best men is, in spite of every effort — and we profess to have made constant effort to secure them — inaccessible to us. We do not doubt that our own illustrated pages are contrasted to our disfavor with those of the London journals. But consider how different are the circumstances. Big as it is, London and its multitude of architects are far more within the reach of editorial influence and persuasiveness; the men and their work are better known and more easily knowable; the meetings and the exhibitions of the Royal Academy, the Institute and the Association bring the editors into frequent personal contact with practising architects, and give them opportunities to see for themselves what the profession about them is engaged upon, and offer chances such as we have not to make selection for their illustrations. How is it possible for us in Boston to know what is doing in the offices of St. Louis, Chicago, Philadelphia, Baltimore, or even in New York? If any one delays his offering in the expectation that we can make a personal bodily visit of entreaty, he little knows the time-consuming nature of an editor's occupations.

To speak now of more specific things. We trust that our readers have found of interest and value the initial-cuts we have published during the past year, and if they have, that they will be willing to contribute a little more freely material of the necessary character. We do not ask for more than pencil tracings of note-book sketches, of bits of original design of suitable character, or of any interesting subject that may be encountered in turning over the leaves of architectural books or periodicals. For offerings of such material we shall be very grateful. In the early years of this journal, when our processes of reproduction had not reached their full development, and when our own drawing-room was a non-existent thing, we were forced to accept for publication only line-drawings in pen-and-ink of great preciseness of execution. Since that time our processes have been vastly improved, and we have succeeded in securing very satisfactory results from clear pencil-drawings, and once or twice from washed drawings in monochrome. Our facilities for re-drawing colored drawings or those whose artistic execution is inferior to their architectural merits, have also grown, and architects need no longer hesitate to offer drawings for publication because of failings in these particulars. If acceptable in other respects we shall be glad to publish them — in time. Moreover, we have now, or soon shall have, in operation a new reproductive process, which will enable us to reproduce in monochrome, more or less satisfactorily according to the actinic effect of the colors used on the original, washed drawings as they leave their authors' hands, and also to publish views from nature; and we should be pleased to receive from architects ordinary photographic negatives, of suitable size, of buildings erected from their designs, or of picturesque subjects and buildings of historic interest, although it is probable that we should find some negatives not suited to the process for various technical reasons difficult of specification.

A very serious discovery is said to have been made in respect to the recent explosions of steam-pipes in the streets of New York. According to the account which we find in the *World*, complaint was made a few days ago at the office of the American Steam-Heating and Power Company that steam had been shut off by some person unknown from certain buildings in Exchange Place at about eight o'clock the previous evening. The next day the complaint was repeated, and a man was deputed by the Company to watch the building. On the following evening the steam was again cut off, but as investigation failed to show any tampering with the local valves, the watchman hurried back to the main office, where he found the engineer wondering at the high pressure shown on the steam-gauge; and guided by this indication the man-hole just in front of the boiler-house was opened, and the large valve was found to be screwed down tight, shutting off the steam from about ten miles of street mains. The strength of the valves being less than that of the main supply-pipe behind it there would be some danger that the accumulated pressure might, unless the engineer at the central boiler were on his guard, burst through it, filling the pipes beyond with steam at a pressure of seventy pounds to the square inch, and with a certain explosive force, due to the suddenness of the movement, which they might not be able to resist, and under some circumstances a great deal of damage might be done. As it is hardly likely that such a valve would be closed except with malicious intent, information was given to the police in order that a thorough watch might be kept. According to the officers of the company,

there is reason to believe that the explosions at the corner of John and Nassau Streets, and at the junction of Liberty and Williams Streets, were caused by intentional tampering with the pipes. In the former case, the valve which gave way was found to have been loosened with a wrench, after the engineer in charge left it, just enough to give an opportunity for the steam to do the rest, and as the valve which failed in the same manner in Liberty Street was easily accessible from a man-hole, a similar operation may have been carried out there. Suspicion is said to attach to a former employé of the company, who is likely, if such charges are proved against him, to repent his cowardly mischievousness.

Owing to defects in the roof over the Assembly Chamber in the State Capitol at Albany serious infiltrations of water have taken place in the stone-work of the walls and vaulting, and the face of the wall forming the tympanum under one of the great arches, on which is painted one of Hunt's famous pictures, has begun to scale off in large patches. This is too common an experience with sandstone masonry which has been soaked with water from the top to be particularly worthy of comment, except for the fact that the exfoliation carries away with it the precious painting, in patches from a few inches to a foot in diameter. To prevent the total destruction of the picture, men have been employed night and day in drying the stone with hot irons, and Mr. John G. Carter, who was Mr. Hunt's assistant at the time when the paintings were executed, has been sent for to retouch and repair the places where the original work is hopelessly spoiled.

A determined attempt has been made in New York to prevent the obstruction of sidewalks by poles for the conveyance of electric wires. A few days ago some men from the United States Illuminating Company began to set poles along the south side of Fortieth Street, between Fifth and Sixth Avenues, and in the course of their operations placed one in the vaults under the sidewalk which belong to the Hotel Royal, at the corner of Sixth Avenue. The proprietor of the hotel, Mr. Meares, very naturally objecting to such an intrusion, sent a porter to cut the pole down. The foreman of the party from the Illuminating Company caused the porter's arrest, but Mr. Meares answering for his appearance to be tried for malicious mischief, he was released, and Mr. Meares then obtained a temporary injunction forbidding the erection of any poles in front of his premises. Meanwhile, Dr. Wylie, who lives on Fortieth Street, near by, finding that a pole was to be set up in front of his house, endeavored to restrain the workmen, but was driven off by one of them, who threatened to "lay him out" with an iron crowbar. He then invoked the aid of the law, and had the belligerent workman arrested, and word having been sent to the Police Commissioners, an order was issued putting a stop to all further operations. The next morning a number of the residents on Fortieth Street met to take concerted action in ascertaining and defending their rights in regard to the matter. It was found that the Illuminating Company had acted under authorization from the Commissioner, of Public Works, but that the authorization had been revoked as soon as the objections of the abuttors were known; but it appeared also that Fortieth Street, bordering as it does upon the south side of the Reservoir Park, was subject to the jurisdiction in such matters, not of the Commissioner of Public Works, but of the Park Commissioners, and these, being appealed to, issued a summary order to the Captain of the Park Police to arrest any one who should attempt to place poles in the street.

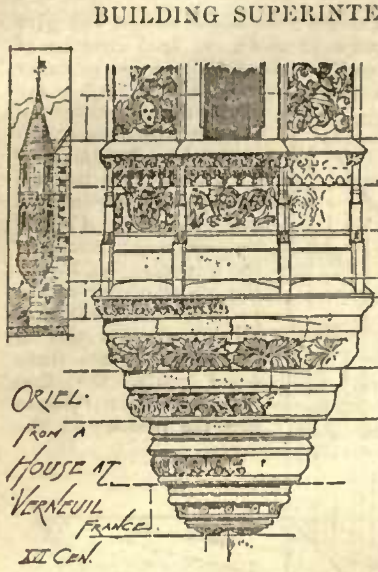
To fortify themselves still further, several of the property owners then obtained special injunctions restraining the Illuminating Company from erecting poles or stringing wires in the street, and accompanied by orders citing the company to appear and show cause why the injunction should not be made permanent. The reputation of the residents on West Fortieth Street for insisting upon their rights is already pretty good, and strengthened as they are by such an array of arguments they are hardly likely to be molested again. Meanwhile, the Illuminating Company must find another way of carrying its wires to their intended destination, or some person or persons must go without the electric light which they wish for. Of course, it is very desirable that all electric wires should be carried underground, but it is hardly less desirable that some way should be found for allowing them to be carried temporarily above the surface, until a better mode is invented. At present, the unreflecting prejudices of a few persons, who refuse to allow wires to be placed either in front of or above their houses, may, and in some cases does, deprive their neighbors of the use of the telephone exchange systems, quite as much to their disadvantage as to that of the telephone company, and without any real benefit to anybody, and although electric-light wires can be carried beneath the surface where telephone lines cannot, the practicability of burying wires conveying a current of high intensity is by no means settled.

Another chimney accident is reported from England, a shaft at Bradford having fallen upon a building full of operatives, completely demolishing it, and killing and wounding about ninety persons, nearly all of whom were women and children. As the boiler flues of eight mills were connected with the shaft, its destruction puts a stop to their operations, and about three thousand persons are thus thrown out of employment. The cause of the catastrophe appears not to be known. In the last serious case of the kind, the failure of the masonry, which seemed to have been executed with the greatest care, was, we believe, finally attributed to the swelling of the Portland cement in which the bricks were laid, but this theory never seemed to explain the circumstances satisfactorily, and it is at least to be hoped that a new light may be thrown upon the subject by the investigation which is certain to be made into the present disaster, which may enable engineers and builders to avoid the possibility of similar ones in future.

Colonel Thomas L. Casey, the engineer in charge of the construction of the Washington Monument, has submitted to Congress his annual report, which shows that great progress has been made during the year, ninety feet of masonry having been added to the shaft, which is now three hundred and forty feet above the base. If provision can be made for procuring stone as rapidly in the future as during the past season, Colonel Casey believes that the shaft can be entirely completed before the close of the season of 1884, and possibly early in the summer of that year. Although one hundred and seventy-one feet yet remain to be added before the obelisk attains its full height, the construction of the upper portion is very much lighter than the rest, and it is estimated that ninety-two one-hundredths of the total weight has already been placed upon the foundation. The cost of completion, exclusive of the terracing or other ornamentation around the base, will be about two hundred and fifty thousand dollars, and there can be no doubt that the necessary appropriation will be readily made, if for nothing else, at least for the sake of securing to the present Government the honor of having finished the highest structure in the world.

The picture of Raphael called the Madonna dei Candelabri, which has been lent for a short time to the Metropolitan Museum in New York, is to be exhibited with all the precautions which so valuable an object demands. A fire-proof room has been built expressly for it, and the wall on which it is to hang has been fitted with the rolling iron shutters used for protecting the windows of stores, so that at night the shutters can be drawn and the painting securely screened from mischievous hands. An effort is likely to be made to secure subscriptions for purchasing the picture, and it is much to be hoped that, if made, it will be successful. There is no lack of money in New York for such purposes, but it must be confessed that the qualities of Raphael's pictures are not such as to appeal much to the taste of ordinary visitors to the Museum. Of course this does not prove that the taste of the average citizen of New York is bad, but such pictures as he has been accustomed to see and admire — the Schreyers, Bouguereus, Jacquets, and Gérômes, to say nothing of "impressions" and "harmonies," — leave the mind quite unprepared to find much pleasure in the sweet peace of the best Italian painting. If we ventured to make any suggestion on such a subject, it would be that the trustees of the Museum should beg the loan of Mr. Aspinwall's pictures to hang by the side of their Raphael. With these, and perhaps some of the Jarves pictures from New Haven, a room might be filled with paintings, the influence of which upon the minds of visitors would be very different from that produced by the collections generally seen among us, and we imagine that few persons who cared at all for pictures and were familiar only with New York galleries, would leave such a room without feeling that their ideas had undergone a change.

BUILDING SUPERINTENDENCE. — XXV.



WE are now ready to put the drawings into definite shape.

Beginning with the proscenium-arch, whose form we wish first to determine, we consider what requirements of width and height it is necessary to conform to, and reflect that as the hall will often be used for balls, fairs and other entertainments which will fill it to its utmost capacity, it is desirable to make the proscenium opening as wide as possible, in order that the stage may not be too much separated on such occasions from the auditorium. Allowing only a small projection on the inside of the tower wall, with an abutting wall on the other side of the arch of the same width, we shall have an opening of 44 feet in width, which is ample for our purpose. The height, however, is restricted by the consideration that the height of ordinary theatrical scenery is limited, and it is desirable to avoid the necessity for wide "sky borders" to fill the space between the top of the scenes and the soffit of the arch; while it is also of importance in checking the spread of fire from the upper portion of the stage to the auditorium not to make the proscenium opening unnecessarily high. A glance is sufficient to show us that the arch, loaded as it is most heavily at the crown, must have considerable rise, unless it is made of segmental form, which would involve a thrust beyond the power of the limited abutments to support with safety. We will for the first trial give the arch an elliptical shape, making the rise 14½ feet, with 44 feet span, and taking the depth of the arch-stones at 3 feet. Laying out the arch and the wall above it in elevation at a large scale we have the elements necessary for determining approximately its stability. A diagram of one-half the arch is sufficient, as it is symmetrically shaped and loaded, so that the line of pressure will be the same on each side of the centre.

This line will show us the direction of all the forces which act upon the arch and its abutments, and if it fulfils two essential conditions the arch and its abutments will be stable; if not they will be dangerously weak or fail altogether.

These requirements are:—

1. The curve of pressures in the arch must lie wholly within the middle third of the voussoirs.

2. The line of pressure prolonged through the abutment must strike well within the base of the abutment.

The reasons for these will be readily seen. If the line of pressure passes through the central line of the voussoirs, the crushing strain due to it will be equally distributed over the surface of each joint, but any deviation from a central position gives an inequality in the distribution of the strain which increases very rapidly with the variation of the pressure-curve from the central line. So long as the curve remains within the middle third of the depth of the voussoirs, the strain upon each joint is one of compression only, although it may be unequally distributed; but when it reaches the limit of the middle third, the crushing strain at the nearest edge of the joint is twice as great as when equally distributed, while that on the more remote edge is reduced to zero; and beyond this, while the compression of the nearer edge is increased to a hazardous extent, the strain on the other edge passes into one of tension, which, if there should be any opportunity for movement, will open the joints and bend and dislocate the arch until it falls. This is a fatal defect, and the boundaries of the middle third of the voussoir, beyond which the pressure line cannot pass without producing a tensile strain either at the extrados or intrados, must be strictly regarded.

The second requirement, that the resultant of all the forces acting upon the abutment must strike within its base, is obviously a necessary one, for otherwise the effect of the combined pressures would be to overturn the abutment, as often occurs with arches carelessly designed. If the abutment were a solid and unyielding mass, it would be stable if the pressure curve fell anywhere within the base, even at the extreme edge; but in practice the resistance is always given by masonry of some kind made up of small blocks, united by mortar or cement which may be compressed in a greater or less degree; and the effect of a pressure applied too near the edge of such a mass is to crush or distort it, and finally to disintegrate it, so that the usual rule is to require that the pressure curve in an abutment of stone or brick work, standing on a horizontal base, shall strike the base at a point not nearer to the outside face of the abutment than half the distance between this outside face and the point where a vertical line passing through the centre of gravity of the abutment would intersect the base.

To determine the line of pressure for our arch we will take the following method, which is sufficiently accurate, and is applicable to arches of any form, and loaded in any manner.

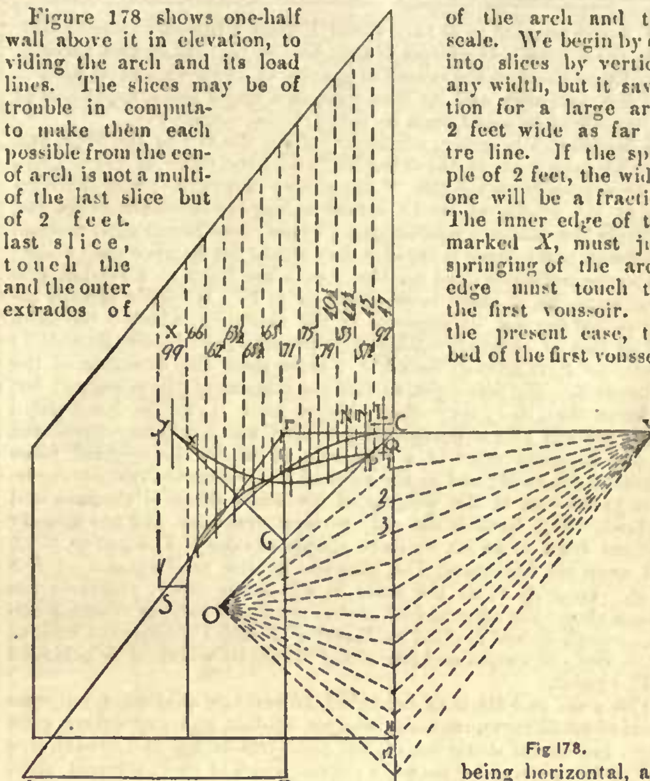


Fig 178.

Figure 178 shows one-half of the arch and the wall above it in elevation, to scale. We begin by dividing the arch and its load into slices by vertical lines. The slices may be of any width, but it saves trouble in computation for a large arch to make them each 2 feet wide as far as possible from the centre line. If the span of arch is not a multiple of 2 feet, the width of the last slice but one will be a fraction of 2 feet. The inner edge of the last slice, marked *X*, must just touch the springing of the arch, and the outer edge must touch the extrados of the first voussoir. In the present case, the bed of the first voussoir being horizontal, and the depth 3 feet, the width of the slice *X* will also be 3 feet.

We have now to find the vertical line in which lies the centre of gravity of each of these slices, and from that the vertical drawn through the centre of gravity of the entire half-arch and its load. If the slices are taken small enough, the centre of gravity may without appreciable error be assumed to lie in a vertical drawn midway between the lines bounding the slice, and we have only to draw the short lines shown in that position. The relative weight of each slice is next to be obtained, and as in a wall of homogeneous masonry this will be proportional to the areas of the slices, we need only calculate these, leaving the thickness of the wall and the weight per cubic foot as constant factors, to be supplied in case we wish to determine any actual pressure from the relative ones which the diagram will give.

Measuring with the scale the length of the two vertical sides of each slice, dividing their sum by two and multiplying by the width, will give their areas in square feet, which we mark as shown.

We have next, for the sake of simplifying our work, to make two assumptions, which experience shows to be justified, although they have no theoretical foundation. One of these is that the pressure curve passes through a given point at the crown of the arch; and the other, that it also passes through a given point at the springing. If these two points are fixed, the rest of the corresponding curve is easily found, and for ordinary purposes we can safely suppose them to be so by the adhesion of the mortar and general inertia of the masonry. For a semi-circular or semi-elliptical arch, which naturally tends to rise at the haunches and descend at the crown, it is usual to make these points coincide with the outer limit of the middle third of the voussoir at the crown and springing, as at *C* and *S* in the figure. For pointed and segmental arches, which under ordinary circumstances tend to rise at the crown and descend at the haunches, the points fixed should coincide with the *inner* limit of the middle third of these voussoirs. If, however, a pointed or segmental arch is most heavily loaded over the crown, so that its natural disposition to rise at that place is counteracted, the fixed point may be at the outer third, either at the crown alone, or both at crown and springing, as may seem best suited to the circumstances.

In the case of our elliptical arch, the points *C* and *S* being the ones assumed to be fixed, we will prolong the centre line of the arch and load indefinitely downward, and then space off upon it in succession the weights of the slices of the arch and its load, or rather, of the areas which stand as the abbreviated form of those weights. Any scale may be taken, as these dimensions have nothing to do with those of the arch itself. At the scale we adopt, 92, the number representing the area of the first slice, will extend from *C* to 1; 87½, the second slice, from 1 to 2; and so on, 11–12 representing the last slice.

Next, take a point *O*, at any distance to the left of the line *C*–12, and opposite its middle point; draw *O C*, *O* 1, *O* 2, and so on, to *O* 12; the simplest way of doing this being to draw *C O* and 12 *O* at 45° with the vertical, which will give *O* at their intersection.

Draw now, from the intersection of *C O* with the centre line of the first slice, another short line, *P Q*, parallel to *O* 1, until it intersects the centre line of the second slice; then from this point, parallel with *O* 2, to the centre of the third slice, and so on, the last line,

X Y, being parallel to *O* 11. From *Y* draw a line downward parallel to *O* 12, until it intersects *C O* at *G*. A vertical drawn through *G* will pass through the centre of gravity of the arch and its load.

If the half-arch and its load were in a single piece, supported at *S*, they would be acted upon by three forces, namely: —

A horizontal pressure, proceeding from the key of the arch, and caused by the push of the other half-arch; the force of gravitation, acting vertically on the line of the centre of gravity; and the reaction of the abutment, which serves to oppose the other forces and maintain the whole in equilibrium. These three forces must meet at a common point, since otherwise they would not balance each other; and as the horizontal and vertical forces are fixed in direction, this point must be at their intersection, or at *F*. We have already assumed that the line of pressure in the abutment, which is the same as the line of reaction against the pressure, shall pass through *S*; hence, as *F* is already found, *F S* must show the direction of the thrust at *S*. We have yet to find the amount of the pressure; but we know that, like every other oblique force, it can be decomposed into a vertical and a horizontal pressure, which will be represented by the adjacent sides of a rectangle of which the original force forms the diagonal; and as the vertical component is obviously equivalent to the sum of the weights of the small slices of the arch and its load, which furnish the only vertical pressures, and are already laid out from *C* to 12, we have simply to take *F T*, equal to *C* 12, and draw the horizontal *T J*, intersecting the prolongation of *F S* at *J*. Then *J F*, at the scale to which the other pressures are drawn, shows the amount and direction of the oblique reaction acting through *S*, and applied at *F*, and *F T* and *T J* show the amount of the vertical weight and horizontal thrust by which it is balanced at that point.

The arch and its load not being, however, a solid mass, but composed of small parts, mutually wedged against and supporting each other, the actual direction of the pressures is not the broken line *C F S*, but a curve, or rather a curved series of short straight lines, coinciding with *C F S* only at the extremities *C* and *S*, and varying in direction with the gradually accumulating weight of the successive slices of the arch and its load from the centre. To facilitate the drawing of the diagram, we prolong *F C* horizontally, and draw 12 *W* parallel to *J F*. As *C* 12 is equal to *F T*, *C W* is equal to *J T*, and, like it, represents the horizontal thrust at the key of the arch, while 12 *W* represents the oblique pressure at the springing *S*. The pressures at successive points in the arch will then be represented, both in direction and amount, by lines intermediate between these two, and if we draw to *W* lines from the points 1, 2, 3, and so on, which correspond to the weights on the central lines of the slices of the arch and its load, we shall have the successive directions of the curve of pressures at its intersection with those lines. Nothing then remains but to draw *C L* horizontally, *L M* parallel to 1 *W*, *M N* parallel to 2 *W* and so on to *S*, where the line will coincide with that previously found.

By referring to the diagram, it will be seen that the compressive strain upon the arch-stones grows continually greater from the crown to the springing, the horizontal component remaining always the same, while the vertical component increases.

Having found the line of pressures, it remains to see whether it is contained in the middle third of the voussoirs. A glance shows us that this is not the case, and the arch is impracticable.

If it were built it would bend outward at *R*, and sink at the crown; the inner edge of the voussoirs would crush at the points where they are crossed by the pressure curve, and the whole would fall.

There is nothing for it but to design a new arch, and as the curve of pressures varies with every form of arch, a new curve must be constructed for each. After trying an ellipse of greater rise, and then a circle, all in vain, we are led to the pointed arch, as being the only one adapted for a large span, with the maximum load on the crown, and by laying out such a curve, as shown in Figure 179, we succeed in passing the curve entirely through the middle third of the voussoirs, taking these at 3 feet long.

We have now three more points to determine: 1. Whether the abutment is sufficient to resist the thrust of the arch safely. 2. Whether the pressure upon any arch-stone will be so great as to risk crushing it; and 3. Whether the inclination at which the pressure is applied upon any voussoir, or any course of masonry in the abutment, is so great that the superincumbent mass will be in danger of sliding on it, instead of simply pressing against it. As we have seen, the direction of the thrust of the arch at its springing is shown by the line *F S*, and if the arch and its load were required to be held in equilibrium by an inclined column, for instance, the line *J S* would show the position of the axis of the column. We have here, however, to resist the thrust, not a rigid support, but a mass of considerable weight, which will add a vertical pressure due to this weight, to the inclined thrust, modifying its direction as well as its amount, and we must find the modified direction of the pressure before we can determine whether it will fall upon the base of the abutment so far within its outer face as we have found to be required for perfect safety.

Strictly, the modified line of thrust through the abutment would be a curve, since the vertical component accumulates as we follow the pressure line away from the springing of the arch; but for our present purpose we need only ascertain the point and direction of its application at the base of the abutment. To do this, it is sufficient, instead of dividing the abutment into successive portions and calculating the modification in the thrust due to the weight of the arch, to regard the whole abutment as a single mass whose weight will give the vertical component which we need to fix the final direction of the thrust. Neglecting the slice of the abutment between its inner face and a vertical line dropped from the extrados of the arch at the springing, since the weight of this does not affect the thrust, the remaining portion will have a trapezoidal shape, and we proceed to find the position of its centre of gravity by drawing the two diagonals of the trapezoid, and finding the middle point *B* of one diagonal, and setting off at *A* on the other diagonal the distance from the lower corner of the trapezoid equal to the distance from the upper corner of the trapezoid to the point of intersection of the two diagonals; then connecting *B* with *A* and dividing *B A* into three equal parts, the first point of division *V*, showing the position of the centre of gravity, is required.

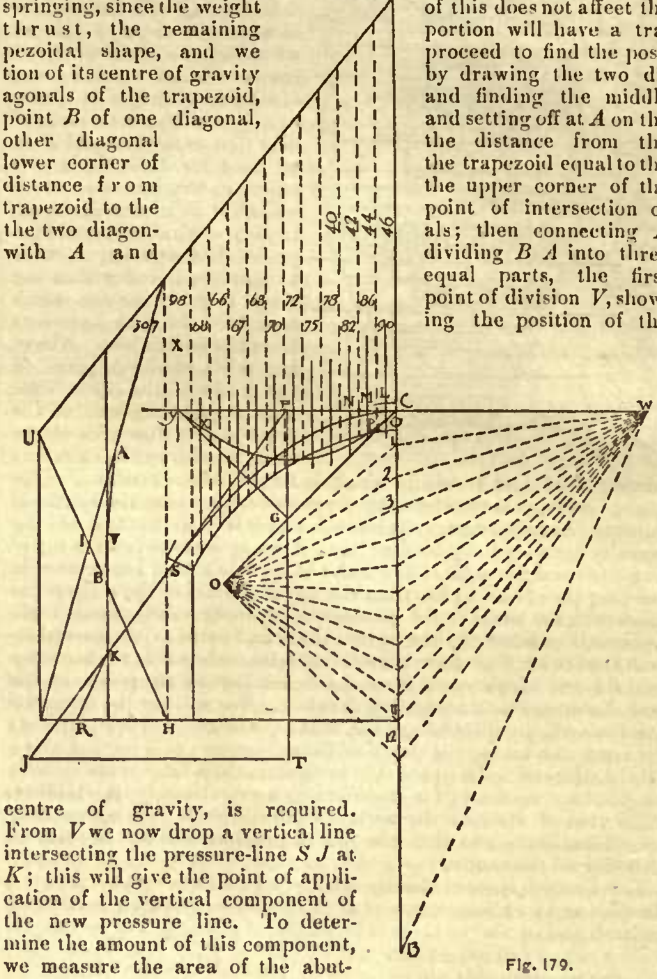


Fig. 179.

From *V* we now drop a vertical line intersecting the pressure-line *S J* at *K*; this will give the point of application of the vertical component of the new pressure line. To determine the amount of this component, we measure the area of the abutment trapezoid as has already been done with the slices of the arch and its load, and obtain 507 as the result. We lay this off from 12 to 13, on the same vertical line that measures the vertical pressures of the slices of the arch and its load, and at the same scale, and then draw 13 *W*, which gives the direction and amount of the total combined pressures of the arch, load, and abutment. Transferring the direction of the final pressure so as to intersect *K*, the actual point of application, we find that it will strike the base of the abutment at *R*, which is nearer the vertical dropped from the centre of gravity of the abutment than half the distance between this vertical and the exterior face of the abutment, and the abutment may therefore be relied upon as stable under the given pressure.

We must now test the second point of safety in our arch, and ascertain whether the pressure at any given joint is greater than the stone can be relied upon to resist. The greatest pressure, as we see at once from the diagram, is at the springing line. Scaling the line 12 *W*, which represents this pressure, we find it to measure 1140, at the scale of this part of the diagram. This, however, being expressed in terms of superficial feet, must be multiplied, to find the pressure which it represents, by the number of pounds which a portion of the wall one superficial foot in area will weigh. The wall is 16 inches thick, and at 112 pounds per cubic foot the weight required will be 149 pounds. The total stress at the springing will be therefore $149 \times 1140 = 22350$ pounds. The area of the joint is $36 \times 16 = 576$ square inches, and the pressure will therefore average $22350 \div 576 = 38.8$ pounds, which is far within the limit of safety.

The determination of the third point, whether the direction of the pressure at any joint is such as to cause sliding, can be only approximately made, since the adhesion of the mortar, the roughness of the stone, and many other elements, will enter into the actual result, but we may safely assume that no pressure will cause sliding of the stone voussoirs which is not applied at a greater angle than 32° with a normal to the direction of the joint. Our pressure curve shows that the angles of application of the stress are all well within this limit, and we need feel no uneasiness in regard to the voussoirs. With respect to the joints of the abutment, however, we may feel some anxiety, as the direction of the pressure for the courses nearest to the springing of the arch forms an angle of somewhat more than 30° with the vertical; but the adhesion of the mortar to brickwork is far greater than to stone, and the true angle of safety is correspondingly increased, so that if we take the precaution of delaying the removal of the centering on which the arch is built until the mortar in the abutment is well set, we need have no apprehension as to the result.

BUILDERS' SCAFFOLDING.—VII.

18th Century Rococo Work.

STAGING is a species of scaffolding; in fact in some parts of the United States the words are used as interchangeable terms, but the former more particularly applies to a stage, platform, or floor, which is erected at once to its specific altitude. Thus a staging is an elevated, temporary, floored space for operating a derrick, or for temporary tramways in connection therewith, or for the purpose of erecting large roof or bridge trusses or girders, or for the purpose of accommodating the ceremonials connected with laying corner-stones, or for the inauguration of monumental structures, etc. Although staging is a more general accompaniment of works of civil engineering, as in the erection of breakwaters, piers, viaducts, etc., nevertheless, in connection with architectural building it is also an accompaniment of importance in certain structural erections, such as the erection of city or suburban ornamental bridges, or roof-trusses of buildings of large span in their permanent place. It either extends over the entire area to be roofed or bridged, or is of sufficient width for working accommodation immediately under the position of each truss or girder, if these are far apart; or else it is constructed under the position of the *first* truss, and is of sufficient extent to serve the purpose of putting together the parts of all the trusses, one after another, after which they are slid along on the wall-plates to their respective positions by means of planks and rollers, or upon double-roller trucks. The *last* truss in permanent numerical order would thus have to be the *first* truss constructed and moved to its position, and the others would follow in reverse numerical succession back to the first, which would be the final truss erected. If there is no compensatory advantage in thus erecting a partial stage at one end of the building in preference to the middle of it, the latter position would only require the completed trusses to be moved the least distance towards either end after being put together. Movable staging is occasionally resorted to where a comparatively long and narrow building is to be roofed; it is furnished with wheels, flanged or otherwise specially adapted to work over a light railway track, or rails of hard-wood which are laid on the floor or joists along the entire length of the building.

For large skating-rinks, exhibition-buildings, railway-depots, swimming-baths, and such like special cases in which arch trusses and specially adapted forms are sometimes erected, very complete and special staging must be provided.

In building upon a beach or shore unusual and special conditions have to be encountered, and in each case the extent and nature of the exposures to the elements must be thoroughly investigated, and ample acquaintance with all the variety of maximum mechanical effects and conditions fully comprehended and appreciated, particularly in regard to the best means of obtaining permanent foundations and substructures, which shall safely withstand the fury of the elements in their greatest intensity.

When solid rock would seem necessary, but is seldom readily attainable in the precise position desired, it becomes necessary to resort to masonry piers, piles or trestle-work, or like devices in order to obtain the necessary foundation upon which to erect the superstructure, and notwithstanding that many of such buildings are only for summer use, permanence is essential and economy desirable; and hence, instead of resorting to masonry substructures which would necessitate the sinking of expensive caissons and costly stone or cement-concrete construction, iron screw-piles or cylinders are driven into the beach. Sometimes a landing-pier for vessels forms a prolongation of the staging with all needful approaches from the land. Attached to the heads of the sunk piles are iron columns in suitable

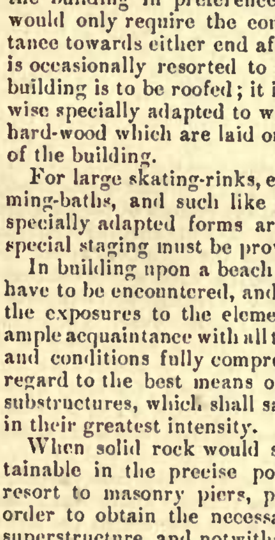


Fig 21.

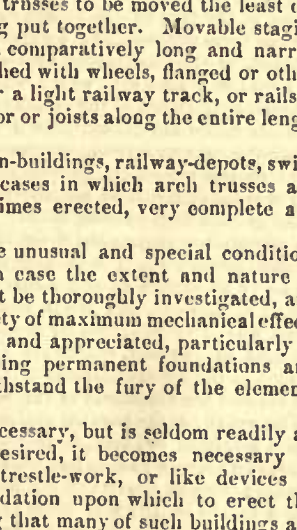


Fig 22.

lengths for being readily handled by such constructive appliances as are to be employed. These columns reach to a uniform level above tide-water, and are all latticed together with a system of tension-bracing in five cubic or normal planes, each intermediate column being tied and braced in eight alternate or opposite directions in each horizontal plane, repeated at convenient intervals in height. Four directions are alternate in lateral planes, four more in transverse planes, and eight more in the diagonal planes of the cubic bay. These being the only directions in which a square system of planting the columns, *i. e.*, in lateral and transverse directions square to each other, admits of, and as it affords eight different horizontal directions of braced resistance for each intermediate column of a skeleton structure, it suffices for our purpose of illustration to confine our observations to this system. When the piles, prolonged by vertical columns or standards, are brought to a uniform level at the proper height and braced as indicated, a frame of girders and transoms of iron or timber to carry the floor-joists is laid upon them, the floor system being further secured against side-strains by lateral bracing. Thus far the permanent structure above alluded to will coincide in general principles of arrangement with similar temporary structures for short-lived purposes under similar conditions of exposure, the methods and manner of construction, and the kind and quality of materials employed being regulated in each instance by the permanent or temporary character of the proposed structure. The regulation of any simple geometrical arrangement of plan of piles or columns of the permanent structure must depend upon the general requirements of the structure. There will occasionally also be an auxiliary system of direct supports necessary for incidental features which cannot be brought directly over the individual columns of any general system, and hence, special care is necessary to provide at the outset in the staging for the admission of such incidental columns and their bracings, without any interference with any parts of the staging. The same care, of course, will be required when devising the staging to avoid its interference with the general system of columns and bracings, as a large building (which, in such circumstances would probably be of wood, or of wood and iron in combination) mounted upon legs above storm-water reach exposes so extensive a surface to the force of high winds, that not only great breadth of base and secure interbracing of the columns, but also ground anchoring may have to be resorted to, to prevent lifting, oscillation, or overturning. The method of anchoring will depend on the nature of the facilities available.

In order to erect such a permanent structure as here indicated, a temporary staging becomes necessary. In the hurry of the moment we neglected to prepare a special illustration when the collection of engravings for this series was being executed; we shall therefore use Figure 21, which shows a temporary staging formed of heavy timbers, which is of a type that has been erected over deep water to carry a tramway used to deposit materials for the construction of a breakwater; but it may be noted that for our purpose the trussing of the girders would probably be omitted, and the character of the structure generally would be less complete in its appointments, and more flimsy in some respects, although, perhaps, a show of more extensive bracing, reaching to the bottom, might have been attempted to take the place of the anchoring below referred to, as it will be observed that the columns in the figure are only braced at the top with tension-rods fixed to the transom at mid-span, but in this case shore anchorage had been resorted to to resist side-strains. It also shows the transverse timbers or girders stiffened with queen-post trussing, evidently not to carry the tramways, as they are supported directly by the standards, but apparently to resist the deflecting strain which the downward action of the raking rod-bracing (which is intended to preserve from distortion the angular relation of the vertical with the horizontal timbers) would produce, when the structure was acted on by wind strains, and as this bracing only acts as a tie having no corresponding sectional area to enable it to resist compressive strain, therefore, it cannot act as a *strut*. There is no stiffening or trussing needed against an upward thrust which would be occasioned by the action of a strut, but which in any event would have been counteracted by the adjacent tie-brace, so long as its resistance held good.

Economy in bracing may be effected, when the standards are of timbers, by only bracing the middle third, fourth, or other appropriate fraction of the height, with one or more panels in height, as may best correspond with the intervals between the standards.

It may be noted that in setting screw-piles or other standards in such circumstances pontoons are specially useful in securing exactness of position of the piles, when these must be set in water, especially when the pontoon is constructed with four legs and guide-piles, which reach down to the bottom, and on which it partially rests, it being also partly supported by the water. Sometimes when foundations are difficult of access, it is more economical to have the standards disposed in clusters of a convenient number and arrangement at intervals, each cluster forming an independent pier, trestle or *bent*, which is independently braced. They are all connected together across the top by girders or trusses, and a flooring system, and when very high are further secured longitudinally by horizontal rails at intermediate heights and diagonal bracing.

Figure 22 shows a form of staging in transverse view, in order the better to exhibit in elevation the flying wind-braces, to which we have before incidentally alluded. It purports to be a specimen of staging used in the erection of large structures where considerable breadth has to be covered and large weights sustained temporarily at high elevations, such as wide truss-bridges, viaducts, etc., while putting the parts together in their proper position on the abutments and piers, until they are joined, bolted, and riveted together in a complete self-sustaining structure. In such a case the staging is commonly called *false works*. It consists as in the framed scaffolding of

square timbers, standards footed on sills, all brought up to a level, across the tops of which horizontal transverse timbers are laid, fastened with dog-irons. These horizontal timbers extend 8 to 12 feet or more beyond the outside standards (depending on the height of the standards between cross-transoms), its extremity being supported by a standard. Raking braces foot down upon the sills, and wedge up close under the transverse timber, there being one bay of cross diagonal bracing between the sill and transverse timbers, laid across the standards and bolted to each, where in contact with them. This assemblage of timbers as shown is repeated in each of the three stories above, with the exception that the diagonal bracing is only *alternate* instead of being *cross* in each story, also that the outer extremity of the transverse timbers is supported by a raking strut, instead of a vertical standard, and it buts against cleats bolted to the standards. Sometimes the strut is in two pieces, one of the pair being on each side of the brace, and all bolted together at the intersection. Sometimes the strut and brace instead of thus intersecting about mid-length, meet and abut against each other at mid-distance on the standard. This becomes necessary when the cross-transoms are a great height apart, making the bracing angle too sharp to be effectual with a convenient projection of transverse timber, for even if a sufficient projection is attainable, heavy timbers would be necessary for the bracing and strutting. When the brace and strut meet centrally in the height of the standard, between transoms, there is a counter-bracing added to oppose the strain induced by the foot of the brace, as described in the framed scaffold.

It will be well to observe the distinctive objects for which such bracing and strutting may be employed: thus, (1) to resist wind or lateral strains, encountered by the structure, and also by the superstructure of whatever nature or extent; and (2) bracing, of a similar form, intended to stiffen the standards against bending under a superincumbent load. The precise mechanical effects differ, as likewise do the scientific methods of investigating the strains produced under each condition also differ. This part of our subject will be taken up later.

The flying wind-brace, we may assume, is intended to reinforce, in a sense, the panel or bay bracing, which here serves to connect together the two outside sets of flying wind-braces, from story to story, and at the same time prevents lateral bodily movement of the entire structure as if in one compact mass, and to stiffen the outside tier of standards against the strong leverage of elevated side or wind strains by means of shorter timbers, and consequently is of smaller scantling and less horizontal spread (sufficient horizontal spread being in many cases inadmissible for high-reaching braces) than if either of the upper stories were braced directly up from the ground. The flying wind-brace, as in the above figure, it will be observed, is equivalent in form to the original cross-bracing, minus the outside standard. Cross-bracing of this kind was described in connection with the Scotch *Gabbert* scaffolding. When the force is acting sideways in any particular direction on the outside tier of standards alone, as that of the wind on an independent superstructure, as from the right towards the left side, the bracing and struts are in compression on the left side, so long as the standards and transoms remain normally perpendicular to each other; but so soon as distortion is induced, and the angular relation of the vertical and horizontal members begins to decrease on the one side and consequently to increase on the alternate side, the *strut* will be in tension under the above action, and the reverse conditions would take place on the right side, the transverse timbers and the bay alternate bracing conveying the strains from the wind-brace on the one side to the other. The alternate braces should be of sufficient scantling to resist compression as well as tension-strains between fixed points.

THE ILLUSTRATIONS.

"SEACROFT," THE HOUSE OF GEORGE S. SCOTT, ESQ., SEABRIGHT, N. J. MESSRS. PRICE & FREEMAN, ARCHITECTS, NEW YORK, N. Y.

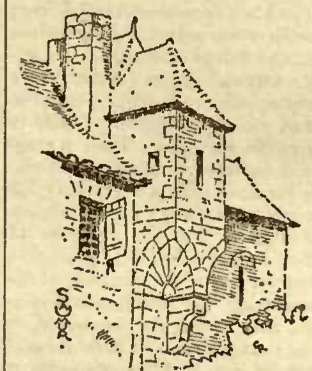
"SEACROFT" is built of heavy framing with the walls lined and felted, and made to resist the stormy exigencies of a very exposed position. The site is upon a high knoll commanding the ocean and a stretch of coast from Sandy Hook to below Long Branch. The house is finished internally in butternut, the first floor is paneled, ceiled, and timbered in the same, with the rafters and beams moulded and carved.

CORRECTION.

In our last issue the name of the architect of the design for an apartment-house was printed Edward when it should have been *Edgar* C. Curtis.

Steel Bars for Bells.—In some places in Europe steel bars are used in preference to bells, supplanting them sometimes altogether in church steeples, and producing very pure, distinct and melodious sounds. An English writer even advocates their general use on the ground that while in point of sonorousness they are equal to the common bell, in certain other respects they are to be preferred to it. Their weight will be light in comparison with the ponderous objects they are to replace; they will not burthen the steeple so much, and, consequently, will give more scope for architectural design; their winding and hanging up will not be so difficult, dangerous, and expensive; they are not liable to crack, as is the case with bells, and are, therefore adapted for use in any climate; they can also be operated by a simple mechanical contrivance. They are also much cheaper than bells.

STRAIGHTENING A CHIMNEY.



We find an interesting account of straightening a chimney, 330 feet high, in the *Wochenschrift* of the Society of German Engineers, from which we take the following particulars. The chimney in question, erected in 1880-81 for the blende-roasting furnace of the Liebehoffnung zinc-works at Antonienhütte, Silesia, for carrying off sulphurous gases, soon after its completion began to curve in consequence of strong and continuous gales from the south-east. The work of straightening it was at once confided to two experienced chimney builders, Herren H. Hohmann and F. Ebeling, of Bernburg. It should be premised that the chimney was begun in July, 1880, the base, 53 feet high and 24 feet square, being finished before the setting-in of the winter, when operations had to be suspended. The work was resumed in the following spring, and actively pushed forward, so that by end of September, 1881, the chimney was completed. Its principal dimensions are:—

			Height.
Base, 24 ft. square			ft. 53
Octagonal portion			" 10
Round Shaft	Diameter at base	Exterior, 19 ft. Interior, 5 ft. 6 in.	267
	Diameter at top	Exterior, 9 ft. Interior, 6 ft. 6 in.	
		Total height above ground	ft. 330

The base is of ordinary Dutch brick laid in lime mortar; the round shaft, 267 feet high, of stone and lime-mortar, to which was added cement in the upper portion of the chimney, from 40 feet below the summit. The thickness of the walls of the round shaft, constructed in thirteen steps each about 20 feet high, is at the lower portion 6 feet 6 inches, at the top 1 foot 3 inches.

The completed chimney was first used in October, 1881. Soon after it began to show a strong curvature towards the northwest, beginning at the foot of the round shaft and running up towards the top in the form approaching a parabola. The curvature was ascribed, as stated, to the continuous southeast gales prevailing at the time, to which the brickwork, which was not yet sufficiently set, had to give. As the foundation of the chimney went down to the solid rock, its curvature could not be attributed to the giving way of the foundation. Subsequent measurements proved, moreover, that the square base had not moved out of the perpendicular, but had remained undisturbed. It was determined by measurements that the summit of the chimney had gradually bent over nearly 10 feet towards the northwest, so that a plumb-line suspended from the centre of the periphery of the inclined chimney-top was hanging outside the base of the chimney. The two builders named above undertook to remedy this dangerous state of matters, and began work on July 1 of this year. The chimney was first mounted by means of their special scaffolding to a height of 139 feet, where the first cutting was to be made. At this portion, the outer diameter of the chimney is 16 feet, the inner 6 feet 6 inches; the thickness of the wall was consequently 4 feet 9 inches. The weight of the portion of the chimney-shaft above this first cutting, of a height of 191 feet, is about 670 tons. Calculations and measurements with zinc-gauges had shown that a perpendicular from the calculated centre of gravity of the portion of the chimney above the cutting to a height of 191 feet upon the section plane intersected the latter about 3.29 inches, inside the periphery of the width in the clear of 6 feet 6 inches diameter, at a distance of about 5 feet from the outer edge of the brickwork.

For safety's sake, and because the mortar had not sufficiently set, owing to the chimney being taken in use directly after completion, six strong wrought-iron rings, with spring locks, were placed round the chimney above and below the cutting. The latter was begun while the roasting furnace was continued at full work, and had proceeded so far by July 21 that the projection of the centre of gravity upon the section had been undercut to the extent of $3\frac{1}{4}$ inches. On one side, however, a piece of the brickwork had remained, and could not be cut away by the saw, because the latter began already to get too much jammed in the cutting. This piece of brickwork prevented the upper part of the chimney going back, as it hindered the intended turning at the end of the cutting. The consequence was that, the other side of the chimney being undercut, the upper part turned back in a slanting direction towards the south-east by only about $6\frac{1}{2}$ inches and a crack running perpendicularly upwards began to show itself in the brickwork at the height of the centre of gravity. In this little satisfactory state the chimney was on July 21; decisive action became necessary, and it was resolved to at once blow out the furnace. The next day the chimney was mounted from the inside as far as the cutting, and the piece of brickwork left as above mentioned so successfully removed that on the same day, in the evening, the undercut part of the chimney turned back the thickness of the cutting. But as this was not sufficient, a second cutting was made at a height of 184 feet, and a third at a height of 223 feet, the whole work of straightening the chimney being completed by August 1. Although it was found impossible to make the chimney perfectly perpendicular, be-

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GOOD & CO

·"SEACROFT": near Seabright N.J. Bruce Price & Geo. A. Freeman Jr. Archts. 28 W. 23. N.Y.

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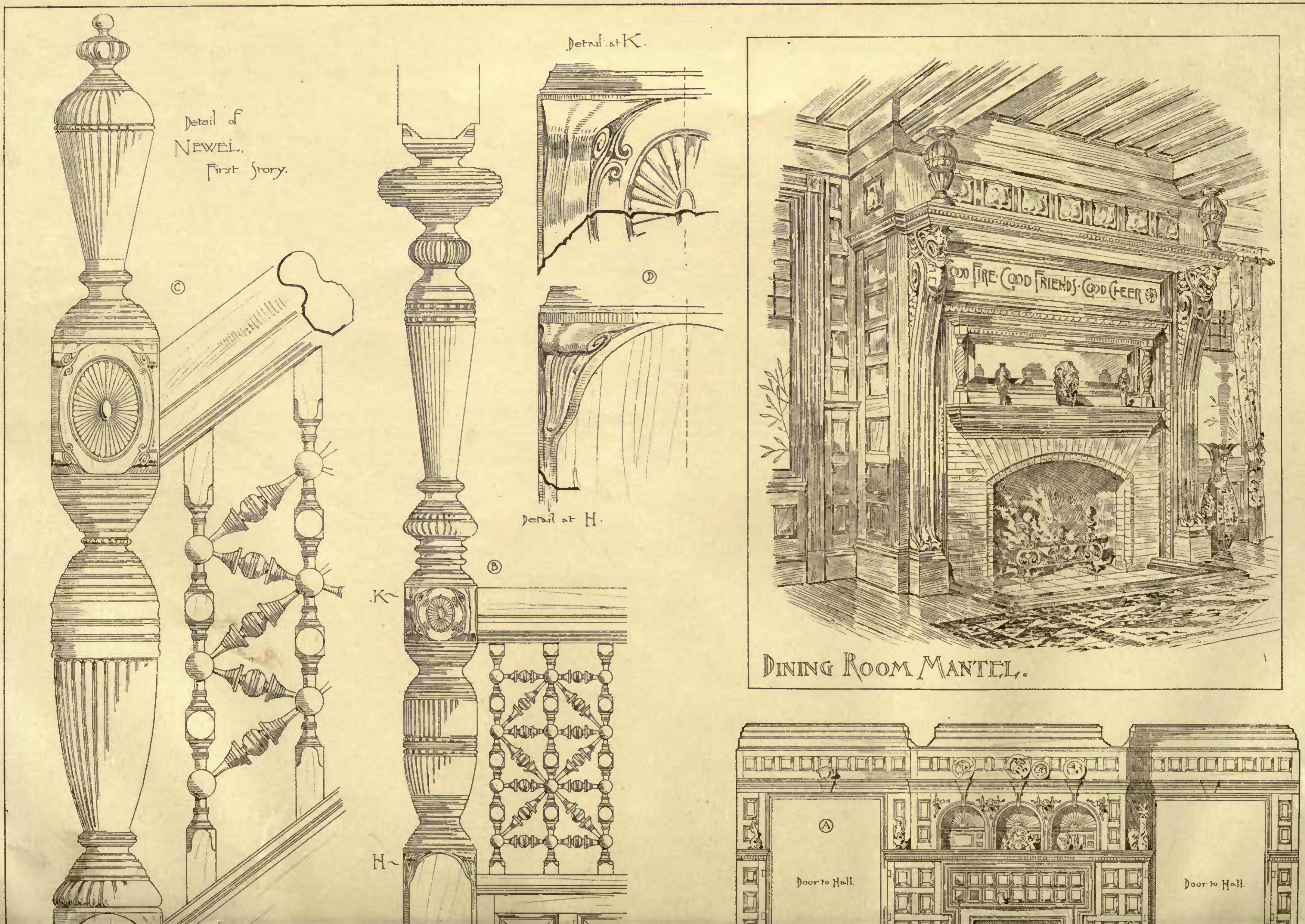
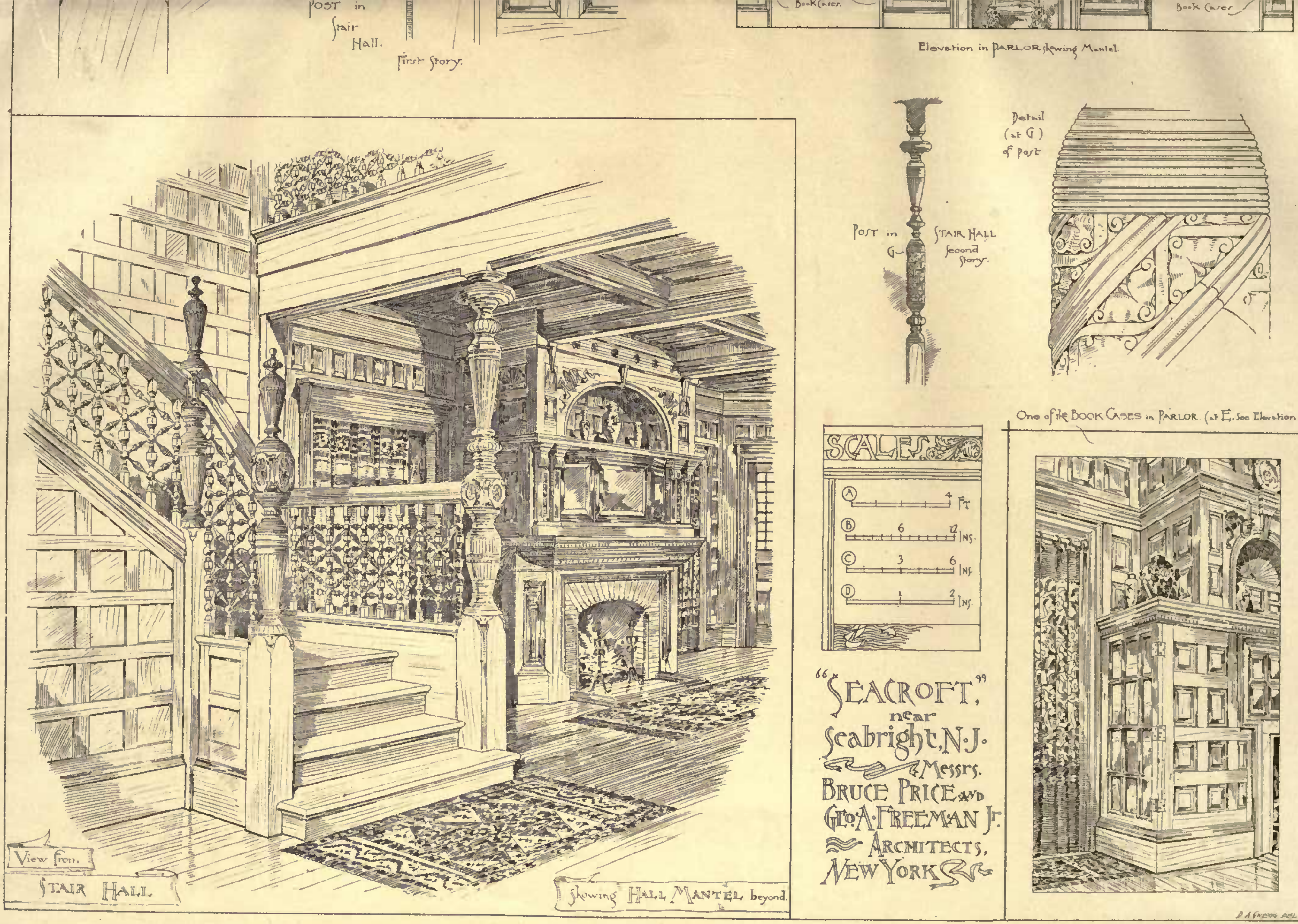


DINING ROOM MANTEL.



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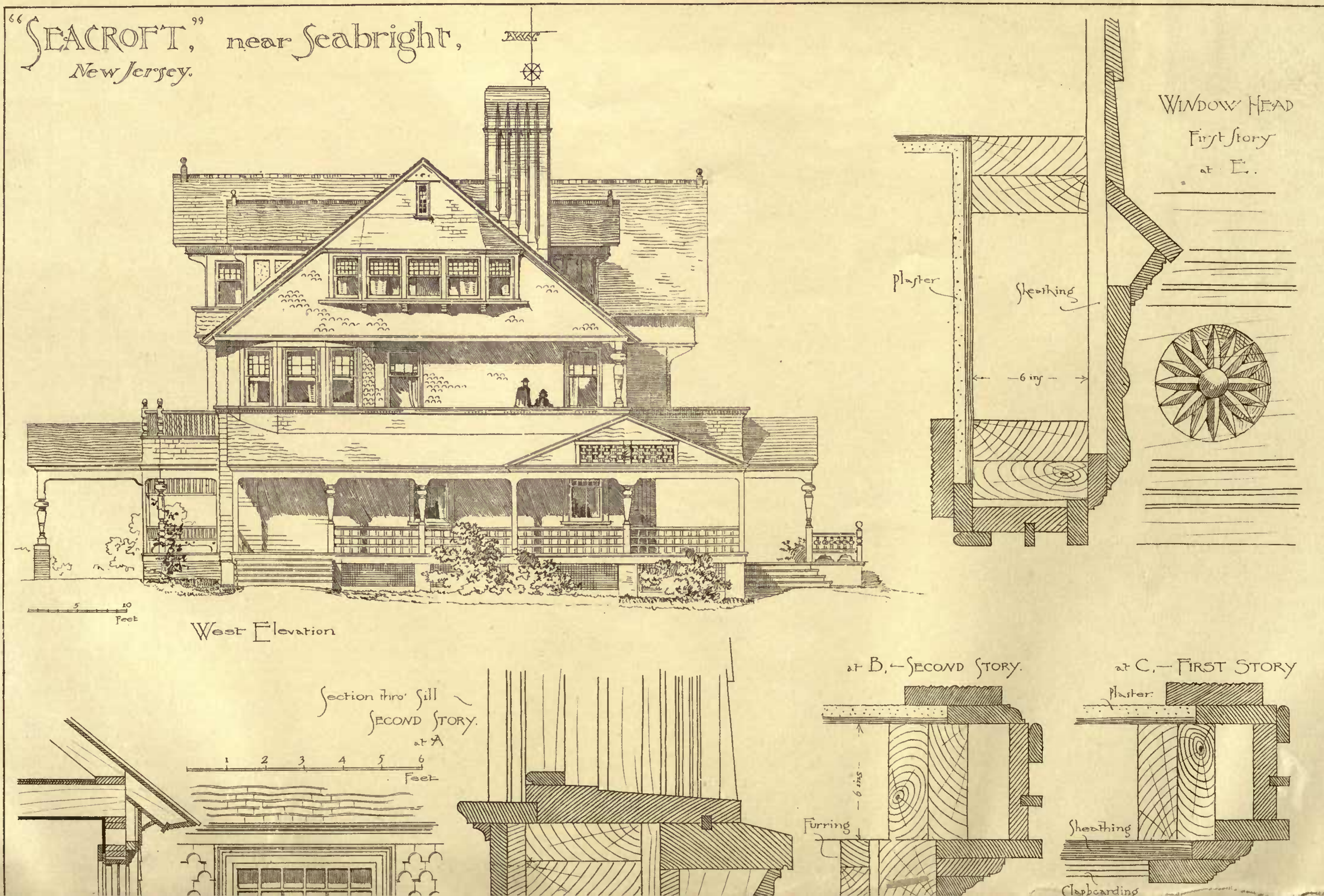
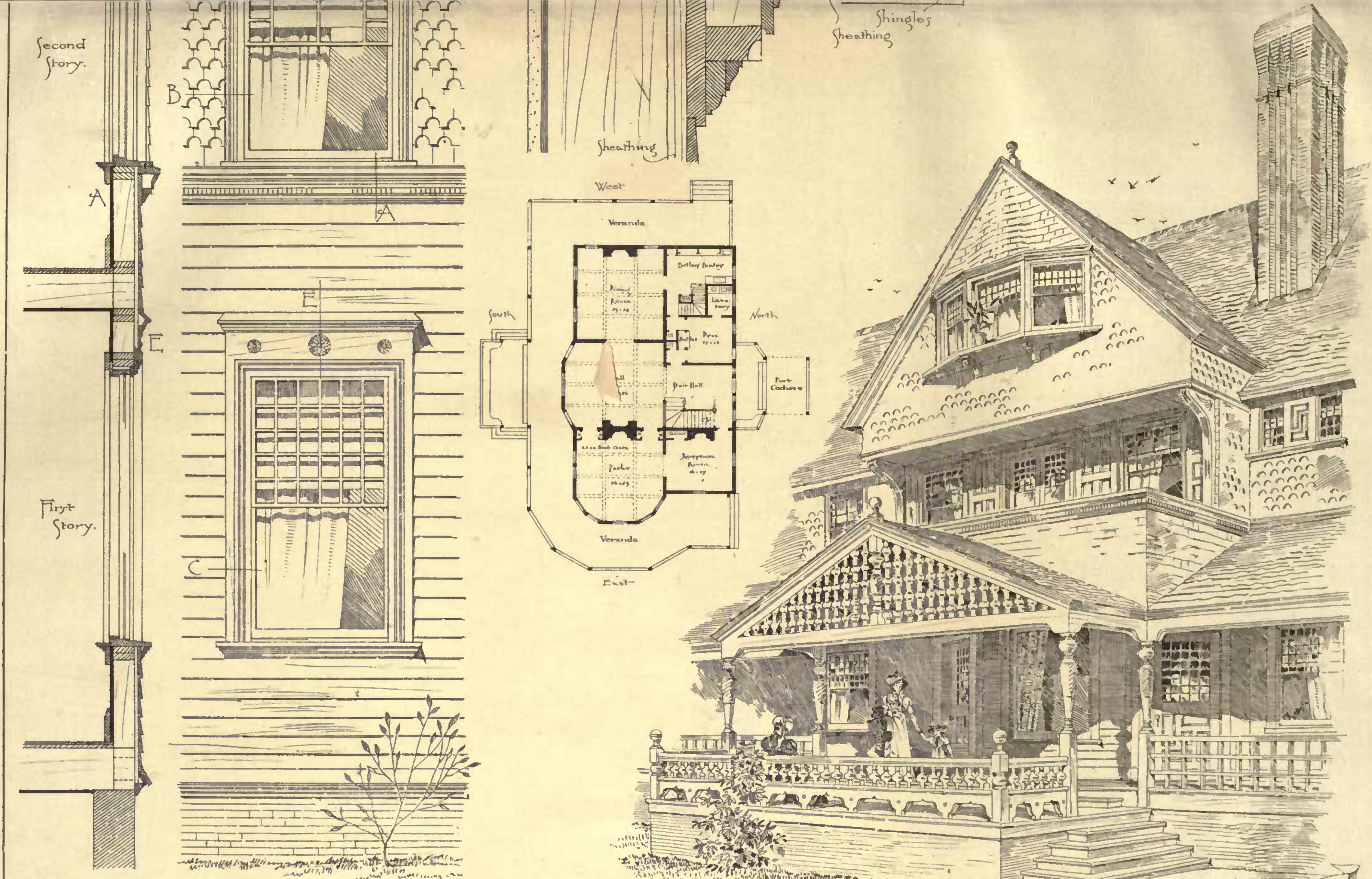




Central Portion of South Front.

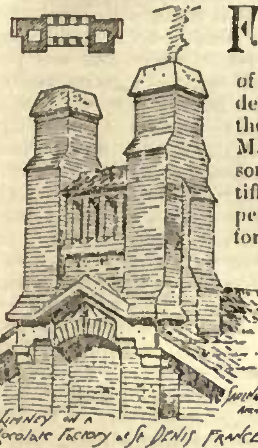
Messrs. Bruce Price and Geo. A. Freeman Jr. Architects, New York.

B. A. Gregg Del.

Heliotype Printing Co. 211 Tremont St. Boston

cause the bend began lower than it was possible, with due regard to safety, to make the first cutting, the result of the operations was considered satisfactory. The stability of the chimney had been ensured, and its outward appearance almost restored to the normal.

LEGAL NOTES AND CASES.



"FEW more curious cases," says a Paris correspondent of the *St. James's Gazette*, "have ever been brought before a court of justice than that which was tried at Bordeaux the other day, the plaintiffs being the heirs of the well-known claret-grower, M. Larrieu, and the defendant a painter of some repute named Roybet. The plaintiffs asked that M. Roybet might be compelled either to pay them £400 or to paint for them a picture of equivalent value; their contention being that he had received from the late M. Larrieu a hogshead of Haut-Brion upon condition that he should do him a picture; but that he had drunk the claret and not painted the picture. They also asked that M. Roybet should be ordered to give up to them a musket and some javelins which the late M. Larrieu had lent him to sketch. M. Roybet's answer to this was that M. Larrieu had sent him the wine as a present, and that no kind of promise was ever made about his painting a picture in return for it; and that as to the pieces of arms, they were at the disposal of M. Larrieu's heirs whenever they liked to send for them. The Court took M. Roybet's view of the matter and nonsuited the plaintiffs, who have nevertheless obtained an excellent advertisement for their claret."

Customs.— "Professional Productions." — Copies of Works of Art.

An action to recover the excess of legal duties, exacted upon the importation of a number of pieces of statuary (Viti *vs.* Fulton, collector) was brought in the United States Circuit Court for the Eastern District of Pennsylvania. By the Revised Statutes, § 2504, Schedule M, "Professional productions of a statuary or sculptor" are dutiable at ten per cent *ad valorem*. On the trial it was conceded that the importations were original works, except two statues of boys which had been executed from antique models; the former therefore were without doubt liable for the low duty only. But as to the copies, it was contended that only the artist who conceived the ideal of the corporealized image is entitled to the benefit of the duty, and therefore that the statuary or sculptor who has modelled the work which he and others have finished alone is within the category of the section. Judge McKennan in deciding in favor of the importer, said:

"The statute clearly embraces all the artistic work of a statuary or sculptor who pursues the employment of his class as a profession. We cannot construe its words otherwise without wrenching them from their generally accepted signification. The statues of the boys copied from antique models were the product of the labor and skill of professional sculptors, and hence were their 'professional productions' within the purview of the law, and are subject to the low rate of duty." — *N. Y. Evening Post.*

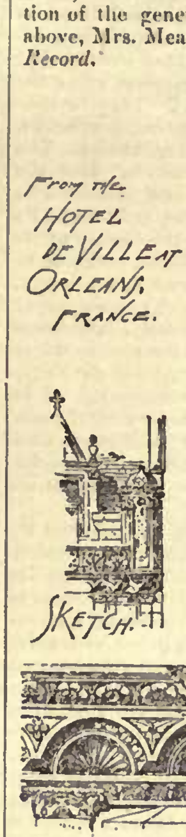
Landlord and Tenant. — Defective Roof.

The Albany *Law Journal* narrates a Minnesota decision which may be cautionary to tenants of apartments, offices and French flats. The owner of a building in Minneapolis let the various stories of it to different persons. As may be supposed, neither tenant hired the roof, and nothing was said in the brief, somewhat informal agreements made, about the duty of keeping the roof in repair. In course of time the roof grew leaky; no one repaired it; a rain-storm occurred and water percolated through the walls and floors, and drenched and ruined the stock of goods of the tenant on the ground-floor, a dealer in fire-arms and ammunition. He sued the owner of the building for damages, but the court held that the owner and general landlord is not bound even where the building is let in portions, to make repairs unless he has agreed to do so or the structure is becoming a nuisance. No doubt this is the rule when a tenant hires a whole building, but we think that in this city, the popular understanding is that tenants of an office, an "apartment," or a flat are entitled to look to the landlord to keep roof, hall, stairs, and the like in reasonable repair. Must they always stipulate for this in so many words? The Minnesota rule is surely very inconvenient, for if the landlord need not repair the roof, the several tenants must each have an implied right to do so, and after any heavy storms, ten or a dozen of dwellers under a leaky roof may gather upon it squabbling as to how it shall be repaired. If such be the law, tenants should understand it.—*N. Y. Times.*

Replevin.— Antique Cabinet.

The widow of General Meade has a suit in replevin in Philadelphia against Charles Gunold, a cabinet-maker, and the Pennsylvania Museum and School of Industrial Art, for the possession of an antique cabinet now on exhibition in Memorial Hall. It appears that the cabinet was brought to America in the early part of the present century by Richard Meade, at that time minister to Spain, and the father of the late general. It was of the kind placed beside the altar in the early days of the church to hold the sacred vessels used in communion service. The piece was elaborately carved, containing fluted columns, Ionic capitals, foliated scrolls, Cupids, carved seahorses and dolphins, besides statuettes, typical of Faith, Hope and Charity, and scriptural texts inlaid in rare woods. From the elder Meade it descended to his son, and in the course of time became considerably scratched and defaced. In 1860 Mrs. Meade sent it to a cabinet-maker named William H. Quass, whose shop was on Monroe Street, for the purpose of having it repaired. At the same time the civil war broke out, and in the worry and anxiety of the next few succeeding years the cabinet was overlooked and forgotten, and remained unnoticed in the little Monroe-Street shop. Finally, in the spring of the present year Quass died, and his executors held a public sale of his effects. The cabinet caught the experienced eye of Mr. Gunold, who purchased it, and then spent much time and labor in restoring it to its former beauty. Having succeeded in his endeavor, he deposited it in the Memorial Hall, in charge of the museum, where it has since remained. Recently it attracted the attention of the general's son, and inquiry developing the facts stated above, Mrs. Meade instituted a suit for its recovery. — *Philadelphia Record.*

DR. DRESSER IN JAPAN.



IT might have been supposed that the long succession of travellers in Japan, headed, as far as graphic power and picturesque freshness go, by Miss Bird, would have exhausted the interest excited in this magical country, and would have left little for Dr. Dresser to tell us. This, however, is not the case. Within the limits of what is most characteristic and personal in his book ("Japan: Its Architecture, Art, and Art Manufactures,") he has been preceded by no writer, and his remarks demand the closest attention from students of the history of art. Dr. Dresser went to Japan equipped with the practical experience of an architect, and entrusted with a mission which gave him unrivalled opportunities of observation. The Commissioner who represented the Japanese Government at the Vienna International Exhibition of 1873 was instructed to study most carefully the art industries of the West, and to take home to Japan a collection of European manufactured objects which were destined to be exhibited in a museum to be built at Tokio, on the model of our South Kensington Museum. Unfortunately, the ship which was bringing this collection of objects home foundered on the voyage to Japan, and therefore Sir Philip C. Owen suggested to Dr. Dresser, who was anxious to see all that was to be seen of Japanese antiquity, that he should appeal to our principal manufacturers, and arrive in Japan with a second collection as a present to the Government of the Mikado. This he did, and arrived in Yokohama with a gift in his hands which opened to him every door in the country, and which secured to him the unique distinction of a personal interview with the Mikado himself. He was treated as the guest of the nation, and among his explorations he was able to enter with the knowledge and experience of an architect to help his observations, some of the most magnificent sacred buildings in the world, to which foreigners had never before obtained access. He spent four months in the country, during which he travelled about 2,000 miles, and he brought back with him a vast number of photographs and drawings of buildings and parts of buildings. Accordingly, although every part of his book is valuable, the architectural chapters of it, and especially the illustrations they contain, are inestimable. Japanese architecture is scarcely understood at all in Europe as yet, and unfortunately, its ancient masterpieces receive at present so little respect from the Japanese Government itself with its mania for modernization of the national life, that they are rapidly falling into fatal decay.

Dr. Dresser's first expedition was made to the magnificent cluster of temples and shrines at Shiba, a suburb of Tokio. Here he had less than his usual good fortune, yet more than that of any previous visitor, for though he was unable to carry away any drawings or photographs of these superb buildings, with one exception, yet he was admitted to certain parts of the Tombs of the Shōguns which

none but great Japanese officials have entered before. The one illustration which he is able to give of the architecture at Shiba represents the water-tank in the court-yard of the great temple. This building consists of a very heavy and richly-decorated roof in the ordinary Japanese style, resting on monolith columns, on the top of which festoons in colors and gold are painted. Dr. Dresser's general impression of Shiba may be quoted; "Buildings so rich in color, so beautiful in detail, so striking in symbolism, I have never before seen or even dreamed of. Had a Gibbons been employed on the wood-carvings, had the colorist of the Alhambra done his utmost to add to forms which in themselves are almost perfect a new charm through the addition of pigments, and were the whole of such details subordinated to fitting places in a vast architectural edifice by the architect of the Parthenon, no more worthy effect could be produced than that of the buildings on which my eyes now rested. We walked through the court-yard inspecting the long rows of stone lanterns, and viewing the exteriors of the various buildings on which we find birds, flowers, water, and clouds carved with a tenderness and boldness scarcely to be surpassed, and so colored that each object retains its individual beauty, while the various parts combine to produce an effect almost perfect."

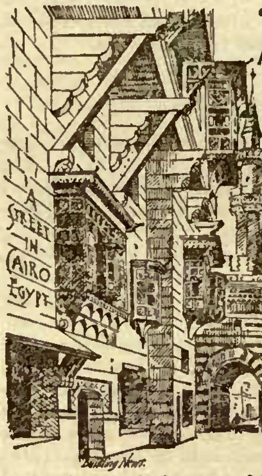
One of Dr. Dresser's most curious and interesting expeditions was to Koya-Zan, a vast mountain at the top of which, nestling in a little depression, there lies a sacred city, full of antique shrines and temples. Four hundred and forty of these holy buildings still exist in a place which formerly contained a thousand. They lie clustered together in the snow, under the shadow of enormous conifers, which meet above them like the nave of some huge cathedral. The strange confusion and obscurity of this mysterious city, into the more arcane parts of which even Dr. Dresser was not permitted to enter, its rarefied atmosphere on the edge of the frost-limit, its throng of priests, its great sanctity and antiquity, the beauty of its prospects from so narrow a point of extreme altitude, combine to make Koya-Zan one of the most fascinating places in the world.

The thirty-three temples of Kioto presented no such extraordinary difficulties to the explorer, and among the most charming illustrations of Dr. Dresser's book, and those over which we are tempted to linger longest, are the full and elaborate cuts from photographs of the Nishi-hong-wan-ji Temple at Kioto. This building is surrounded, as in all such cases, by a low wall, broken here and there by roofed gateways of the most sumptuous magnificence. The most celebrated carpenter-builder that has ever lived in Japan worked on the architecture of Kioto, and his umbrella is hoarded among the antiquities of the place as an almost sacred relic.

It was the high priest of Nishi-hong-wan-ji who was selected by the reforming Japanese Government of 1868 to proceed to London and to report on the influence of the Christian religion on public morals in England. It was the intention of the Japanese Government that if the report were favorable, Christianity should be introduced throughout the country. But after the high priest, — a most enlightened and spiritually-minded man, of very liberal views — had spent eighteen months in London, he reported to his Government that Christianity was far more powerless than either Shinto or Buddhism in preventing crime, and particularly drunkenness, and it was therefore resolved to make no change in the public religion of Japan. The result of this mission might be made the subject of much salutary reflection by those who are anxious at all costs to foist our faith and manners on the gentle races of the East. Dr. Dresser has some extremely severe remarks on the rude and uncivilized behavior of too many of the English and Americans who visit Japan for commercial reasons: and it is more instructive than agreeable to learn that though the Japanese respect our energies and our industrial enterprise they are far from enjoying our customs or desiring to imitate our religion. It is enough to make us shudder for our race to read that Dr. Dresser found in one temple the name of some British or American traveller scribbled in blue paint across the sacred forehead of Buddha.

The chief object which Dr. Dresser had in view in coming into personal relations with the high Japanese officials was to induce them to preserve intact their great artistic industries, and to persuade them that it was by a conservative spirit of taste alone that they could hope to retain the interest of the West. It is plain that such a plea is by no means out of place. The love of tawdry and ugly European manufactures has spread to a most alarming extent among this people, which so lately enjoyed a complete immunity from bad taste. Dr. Dresser's visit to the Mikado was a grievous example of this diseased love of what is European. The passages of the Emperor's temporary palace were covered with bad Brussels carpets; the wall-slides were covered with a cheap French wall-paper, and the throne was an ordinary European arm-chair. Dr. Dresser, in his reply to the Mikado's address, adroitly suggested that we in England follow the Japanese artists at a respectful distance, and that we cannot permit them to suppose that our tapestries and furniture are worthy of the notice of a race gifted with so much genius for beautiful invention. On the whole Dr. Dresser's book is consoling. If it shows us that at Yedo and Yokohama there is a tendency to affect English modes of dress and ornament, it proves to us that the charming manufactures native to Japan still proceed on the old lines in the great provincial factories, and that a spirit of antiquarianism is springing up even among the officials, and is inducing them to preserve their beautiful arts from European corruption.—*Pall Mall Gazette.*

THE USE AND ABUSE OF SCREWS IN WOOD-WORK.



ARCHIMEDES is credited with the invention of the screw, but whether the famous geometrician's labors extended much farther than the enunciation of the scientific principles and the mechanical power of the screw, it is difficult to say. If he made a screw, he certainly must have tried its effect, and was probably well satisfied with its performance, for in the whole range of mechanical appliances in the constructive arts there is not a more useful article than the screw. Archimedes is further reported to have said, "Give me a prop, a position, and a lever strong enough, and I will move the world," and, no doubt, if these conditions could be granted to him, he, as well as others after him, could lift the earth, or aught upon the earth, by a combination of the tremendous lifting and driving powers exercised by a series of screws, apart from the lever. Screws are various, and of various sizes, forms, and materials, but the same principle runs through them all, whether they be manufactured for use in metal or wood-work, or for exerting a lifting, driving, or pressing power separately. Our object here is not to treat of screw-cutting, but rather screw-driving in wood-work, and to throw out some useful hints to the building constituency, and particularly workmen. The use and abuse of screws is a matter of importance to architects, builders, and their clients, for it is according to the way screws may be applied in several building and kindred operations that good or bad workmanship will be evidenced.

Screws are more extensively used than formerly in putting together various kinds of wood framing, and even in cabinet and chair work screws are pressed into service in places where their use would not have been tolerated by manufacturers in the earlier portion of the present century. Although their existence is generally concealed in furniture and fancy work, they are often present, nevertheless, and too often they are used as a substitute for dowels, dovetails, and tenons, in the manufacture of cheap work. It is an instructive and remarkable fact that our building workmen of a century or two back, in many operations in carpentry and joinery, discarded, as far as was possible, the use of nails or screws, depending more on carefully-jointed work, put together by means of mortise, tenon, dovetail, hard-wood dowel, or oaken pin. Their work might have taken a longer time to execute than that done by our present race of joiners and wood-workers, but it was infinitely more lasting, and kept together so long as the timber or wood continued sound. The nearly universal remedy now for every broken article on the part of the jobbing joiner and cabinet-maker is to repair it with the aid of a nail or a screw. Glue is even often dispensed with, or used where it will exercise little sustaining power, and colored putty is not only made to cover the heads of sunken nails and screws on the face of a piece of work, but used also to hide bad joints and workmanship. Some years ago the writer examined an old oaken staircase and hand-rail in a college, which work was executed more than two centuries since, and in the construction of which not a nail nor a screw was used. From time to time, over long years, some slight repairs were made, but the workmen during their operations were never able to discover that a nail had been used in the original construction. There were mortises and tenons, grooves and tonguing, wooden pins or dowel-work, but no iron fastening of any kind. The writer also examined more than one old roof in which the use of iron spikes, nails, and other iron fastenings was dispensed with, and the joining of the timber was effected without their aid. In the hinging of doors and other frame-work it is necessary to use screws, but, unfortunately, many workmen if not watched or cautioned, will not do the screwing properly or in a workmanlike manner. In deal, pine, and other soft woods a brad-awl is sufficient to make an opening for the screw, which opening, of course, should be less than the thickness of the body, and short of the length of the screws used. It will be found, however, that most workmen, not content with tapping the screw a fourth of an inch or so to give it a hold before applying the screw-driver, will actually drive the screw into the wood two-thirds of its length with the hammer. This the workmen will do to save themselves trouble. If there be two hinges upon a door, and if each hinge has eight screw-holes, — four in each plate, — the chances are that the workman will drive half of the screws nearly home in the door-style and frame with his hammer rather than take the trouble of driving them gradually home with the screw-driver. Hence, if the door be a massive or heavy one, the weight of it will tend to the hinges loosening, and after a time will follow a train of other ills, — the "dragging" and "rubbing" of doors, and their makeshift cure by what is known as "easing" them. If remonstrated with for driving a screw nearly home with the hammer, the workman may probably say (as some workmen certainly think) that a few turns of the screw in the wood are sufficient. This is an erroneous and mischievous idea. A screw that is nearly driven its whole length with a hammer cannot make a regular and corresponding thread or spiral in the wood, and therefore its binding and main-

taining power in keeping the hinge in its place is all but gone. Workmen should be made to drive every screw home gradually with the screw-driver, and not only an odd one. In hard-wood operations as well as in soft woods, particularly in hinge-work, screws should be properly driven, and the aperture or opening made for the passage of the screw should be much less than the thickness of the screw to be driven. The screw will bite a sufficient passage for itself. In hard wood, however, it is necessary to give a little more freedom of entry to the screw than in soft wood, and a gimlet is needed for making the suitable opening instead of the brad-awl.

A difficulty is often experienced by persons who wish to withdraw a screw, by finding that though it will turn round under the application of the screw-driver, yet it will not unscrew out. In this case a well-grounded suspicion may be entertained that the screw in question was driven, or nearly driven, home originally by the hammer, instead of gradually by the screw-driver, and that no regular thread corresponding with the screw exists in the wood. Under such circumstances it becomes necessary often to wrench off the hinge or hinges by force, at the risk of their breaking, and this often happens. When hinges have lain undisturbed for long years on old doors or other framings, perhaps for a quarter of a century or double that time, it becomes difficult to extract the screws, although they may have been originally properly driven. This arises from the screws rusting in the wood and sometimes from other causes. Workmen themselves often fail to withdraw a screw, and are forced to break the hinge to enable them to get under the head of the screw, and wrench it out. They often split, and break too, fancy and delicate wood-work articles in their efforts to take off hinges, locks, mountings, and other finishings, despite that simple methods exist for extracting screws that have rusted in the wood. One of the most simple and readiest methods for loosening a rusted screw is to apply heat to the head of the screw. A small bar or rod of iron, flat at the end, if reddened in the fire and applied for a couple or three minutes to the head of the rusted screw will, as soon as it heats the screw, render its withdrawal as easy by the screw-driver as if it was only a recently-inserted screw. As there is a kitchen poker in every house, that instrument, if heated at its extremity, and applied for a few minutes to the head of the screw or screws, will do the required work of loosening, and an ordinary screw-driver will do the rest without causing the least damage, trouble, or vexation of spirit. In all work above the common kind, where it is necessary to use screws, and particularly in hinge-work and mountings, fancy fastenings and appliances affixed to joinery or furniture work, we would advise the oiling of screws or the dipping their points in grease before driving them. This will render them more easy to drive and also to withdraw, and it will undoubtedly retard for a longer time the action of rusting.

As matters obtain now in carpentry, joinery, furniture, and other wood workmanship, with regard to screws, although they cannot be dispensed with, yet it would be advisable in sundry classes of wood-work to minimize their use, and in other cases to do without them altogether. They can seldom be used with advantage to the displacement of mortise and tenon or good dovetail or dowel work. The growing practice of putting together wood-work with screws bespeaks a decadence of skilled labor, and of nails and screws there are far too many pressed into service in our workshops and dwellings. While admitting the usefulness of the screw in various ways, we have here endeavored briefly to show its abuse in wood-work, and at the same time to afford some hints for better methods of procedure in building and kindred workmanship. — *The Builder.*

YELLOW-PINE FOR PAVING PURPOSES.

MR. H. P. ATKINS of Brookhaven, Miss., writes as follows to the *Northwestern Lumberman.*

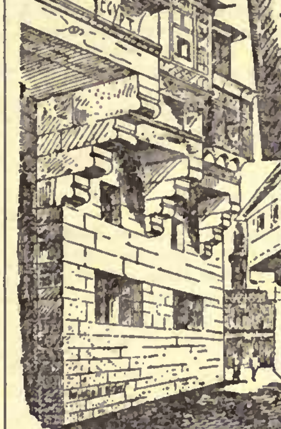
In a recent letter I hinted at the advantages our long-leaf yellow-pine possessed over other woods for some purposes, such as car-sills, bridge-timbers, water-tanks, etc.; I also ventured an opinion as to its superiority for street pavement. Since my letter I have seen it stated that in Galveston, Texas, where the long-leaf yellow-pine has been used for paving purposes, that it has, so far, proved to be far superior to any other wood. Some of the paving pieces that had been treated with creosote and put down seven years ago were taken up and examined, and found to be perfectly sound after seven years' hard usage, and that the blocks so examined had only worn off about one-eighth of an inch in the seven years. Does this not look like a very lasting and durable wood for hard usage?

On my tram-road, where I am using this yellow-pine for rails, on which I am running an engine of between three and four tons weight, I find the rails last unexpectedly long. I saw them out 5 by 5 inches, and 24 feet long; and for my use I do not select the best of the timber for these rails, but usually take what we term here second quality of timber. I find that these last from 12 to 18 months, where I am passing over them nearly every hour in the day, with engine, tender and from two to three log cars; so you can have some idea of what the test is on these rails. I take no precaution to level up the trackway, but put down the rails on the surface of the ground over which I desire to pass, regardless of the indentations. I bridge some places, where a deep gulch or small branch passes along across my route. If I wanted the tram-road to remain long in one particular place I would take greater pains and care in putting it down; but I am frequently changing and putting down as I cut off the timber, and I do not doubt that if I were more careful in selecting the better class of timber for rails that it would last much longer.

For fence posts yellow-pine is as lasting as any timber if it is seasoned before setting it in the ground. I know of one piece of fencing that was put up about ten years ago; the posts were well seasoned before they were set, and the party gave the ends that were to go in the ground a good coating of coal-tar, and the posts are perfectly sound to-day. How much longer they will last would be hard to determine, as they are to all appearance as sound as they were the day they were put up. For post and fencing purposes the heart alone should be used.

Another great advantage that this resinous long-leaf pine has over older woods is that in decomposition there is no poisonous or infectious exhalations from it, but, to the reverse, the vapors from it are of a disinfecting character and perfectly harmless, which I think would make it more desirable for pavements in cities that have low and moist surfaces. The great mortality attending the prevalence of yellow fever in Memphis, Tenn., in 1878 and 1879, I see has been attributed to poisoned atmosphere that emanated from the decomposition of the wooden pavement of that city. The pavement was put down from the timber of the swamp adjacent to Memphis.

HODS: THEIR CONSTRUCTION AND USE.



HODS are of two kinds. One form of hod is devised for carrying bricks, and the other for the transportation of mortar. While differing somewhat in purpose and balance, the two species of hod are yet so closely allied as to be utterly indistinguishable when apart. Indeed, it is a matter of grave interest to men that during the whirl of centuries, when every other inanimate thing has, through the indomitable perseverance of invention, been forced through a process of evolution that has robbed it of almost every semblance of its pristine nature, the hod remains to-day in structure, substance, and design exactly as the hod originally was. At present hods are cheap. Eighty-four cents will purchase one. The craze for all that is æsthetic, early English, Japanese, Etruscan, or antique has passed by the hod unchallenged. The early Irish hod still reigns supreme.

The dimensions of a mortar-hod are as follows: Length of bowl, 22⅝ inches; mean depth of bowl, 9½ inches; greatest width of bowl, 9¼ inches; height of back piece, 12⅞ inches; width of pieces forming lateral sections of bowl, 11½ inches. The dimensions of a brick-hod, it will be seen, are different. They are as follows: Length of bowl, 23⅞ inches; mean depth of bowl, 8 inches; greatest width of bowl, 8½ inches; height of back piece, 10¼ inches; width of pieces forming lateral sections of bowl, 8⅞ inches. It is generally conceded that the mortar-hod is built larger than the brick-hod so as to make the weight when both are loaded as nearly equal as possible.

The shank or handle is 4 feet 2½ inches for each species of hod, and the shoulder rest is always 9 inches long, 3 inches wide, and 1¼ inches thick. This shoulder rest is attached to the inverted ridge-pole of the hod, and prevents the edge from cutting into the shoulder of the proprietor.

Touching the materials used in hod building, it may be said that the earliest ideas still obtain. Iron hods have been tried, but abandoned, because they were liable to rust and become cracked when dropped six or seven stories by proprietors, who invariably and instantly relinquish all ideas and implements of labor at the stroke of 12 and of 6. The verdict of ages is that the bowl of the hod shall be of yellow-pine, and the shank a hickory pole with the bark on. In constructing a hod, it is found necessary to use thirty-three nails for the brick species, and twenty-nine nails and four screws for the kind intended for mortar. The screws are used in the latter instance to fasten the two arms of the shank to the bowl, because screws do not leave holes, as do nails when they become loosened. Small holes allow mortar to escape, and are therefore open to objections. In making the bowl of a hod, eightpenny nails are used; fourpenny nails answer best for the shoulder rest, and shingle nails for securing a narrow strip of sheet-iron that runs over the top of the back piece of the bowl for the purpose of imparting additional strength. All of the nails are machine made, with the exception of those used in fastening the shank to the bowl, which are hand made and highly

malleable. The mortar-hod, besides having four screws, is lined at the seams with white lead. It has been considered somewhat superior to the brick-hod. The weight of hods one hour after completion is ascertained to be exactly as follows: Brick-hod, 9 pounds 6 ounces; mortar-hod, 10 pounds 3 ounces. Fifteen bricks are carried in the common hod.

There is a widespread impression that the shank of a hod is steamed after being split into the V-shape necessary to accommodate the bowl. This is erroneous. The shank, after being slit for a distance of 7⅝ inches, is violently forced asunder by pressure against the wedge-like base of the bowl, and is secured while in that position.

Very many hods are owned privately, and many thousands more are owned by a large company up-town, which makes hods and rents them to builders along with its patent hod elevators. The introduction of hod elevators, oddly enough, met with no opposition from individual proprietors of hods, but, on the contrary, was warmly welcomed by them. The elevators do the work of many men, but as building has increased in a satisfactory ratio, there has always been enough work for men who decided to adopt the hod as a means of advancement or sustenance. Indeed, so well have the individual hod proprietors in question adapted themselves to the existing state of things, that they absolutely refuse to climb higher than the second story now, and builders must, perforce, employ the elevators for stories of a loftier pitch.

At no time in the annals of the city has the hod industry been at a higher tide of prosperity. Thus the outlook for the hod is as bright as its history has been unvarying. —*New York Sun.*

MONTHLY CHRONICLE.

December 4. Opening of the New Law Courts, London, by the Queen.

December 5. Panic in the Court-House at Brussels, Belgium, caused by a false alarm of fire.

December 6. Burning of Stanford Court, Worcestershire, England.

Burning of the Royal Alhambra Theatre, London, Eng.

An unfinished building belonging to the Boston, Hoosac Tunnel & Western R. R. at Mechanicsville, N. Y., is blown down. One man killed.

December 7. Large conflagration in London. Loss $16,000,000.

Destruction by fire of the Court-House of Conecuh County at Evergreen, Ala. All the county records totally destroyed.

December 8. Inundation of Paris by the rising of the Seine.

December 9. A thief raises an alarm of fire in the Odéon Theatre, Barcelona, Spain, and causes a serious panic. One person killed, eighteen injured.

December 10. Fire destroys the jail at Delta, Miss. The prisoners are released, some making good their freedom.

December 11. Large incendiary conflagration at Kingston, Jamaica. At least twelve lives lost. Loss about $12,500,000; 400 stores destroyed.

December 12. Burning of the Enterprise Cotton Mills, Manayunk, Pa. One hundred operatives escape by the hoisting rope; sixteen persons injured.

The new stone chapel of Drury College, Springfield, Mo., is burned. Loss $45,000.

Part of the Spanish War office is burned to the ground. Twenty persons injured. The library and part of the archives are destroyed.

December 13. Fall of a bridge across Great Dry Canyon, Tex. Eight men killed.

Hotel at the Union Stock-yard, St. Louis, Mo., is burned.

December 14. Fire at Hampton Court Palace, near London. Part of the picture gallery and some paintings destroyed.

The Canada Pacific Hotel and the Johnston House at Winnipeg, Man., are burned. Loss $60,000.

December 16. The Pavilion Hotel at New Brighton, Staten Island, N. Y., is burned by an incendiary fire. It was unoccupied at the time.

The old State-house at Lansing, Mich., built in 1847 and lately occupied as a factory, is burned.

December 17. Explosion in a cartridge factory at Mt. Valerien, near Paris. Thirty women seriously injured.

Explosion of a powder-mill at Mountain View, N. J. Three men killed.

December 18. Serious explosion of the pipes of the American Steam-Heating Company at the corner of Nassau and John Streets, New York.

December 19. A fairly heavy earthquake shock is felt at Concord, Dover, Salmon Falls, and neighboring towns, N. H.

December 20. The Copeland Hotel at Pembroke, Ont., is burned, the guests escaping with difficulty. Loss $100,000.

December 21. The Sisters of Mercy Hospital, Big Rapids, Mich., is burned. All of its sixty-three patients are saved.

December 23. Panic in a church at Mt. Vernon, N. Y., caused by the burning of Christmas decorations. A few children injured.

December 28. £5,000 damages awarded the sculptor Belt in his libel suit against Lawes.

Bernard Afinger, a German sculptor of repute, dies at Berlin, aged sixty-nine.

A factory chimney at Bradford, England, falls and crushes a factory building. Thirty-six persons killed, fifty injured; mostly women and children.

December 31. Slight earthquake shock felt at Halifax, N. S.

THE $3,000-HOUSE COMPETITION.

TORONTO, December 29, 1882.

To the Editors of the American Architect: —

Dear Sirs,— Will you kindly inform me whether the competition advertised in *American Architect* for a $3000-dwelling is open to Canadian architects or only to those in the United States.

Yours truly, Geo. R. Harper.

[These competitions are open to everybody. — Eds. American Architect.]

NOTES AND CLIPPINGS.

We will remind intending competitors that the drawings submitted for the $3,000-house competition, must be received at this office on or before Saturday next, January 13.

Anecdote of W. M. Hunt. — Your stories of Hunt remind me of another, hardly less amusing, and, like yours, illustrating his sense of the dignity of his art, and his peculiarly undignified way of showing it. During the last winter of his life he one day called upon an artist to look upon a portrait which had been returned with some expression of dissatisfaction from the subject and owner, and to give his friend, the artist, the benefit of his judgment in the matter of changing and so improving the picture that it should "pass muster" as a creditable work of art, even if it did not quite suit the taste of the patron. The chief defect complained of was the complexion, which was thought to be sallow; and it was true that in the process of giving the flesh a warm glow the artist had given an impression of local yellow in the flesh tints, so strongly marked that the complexion was yellow. When Mr Hunt entered the studio, he looked at the portrait as it stood upon the easel, and said: "They think it is too yellow, do they? They always think it is too something except good. Your yellows are all right with your reds and the general tone of the picture, and that is well enough. Look at that bit of sky in your landscape (pointing to another picture). Isn't that good for sky to your trees and foreground? But it isn't much like that," looking up at the light which poured through the window; "and who said it was? The fact is, people don't know anything about art, and the more they know about other things, the less they know about that. But they 'know what they like,' and they don't mean to pay till they get it. They rank portrait-painters with tailors — no fit, no pay. We ought to make a stand against the unreasonable demands of the public, and let the patron share our risk. Of course we all do the best we can, and we should be paid for our work just as we pay our doctors and lawyers, whether they bring us through or not. I would have an order for a portrait mean the best thing that I can do with a reasonable effort, and that should fulfil my obligation and entitle me to be paid. Of course I like to have people satisfied when I am, but I am the one to be pleased. I know something about my work, and they don't, and when I am willing to let a picture go, that ought to stand for something, whether they are satisfied or not. But then there is another way. You know we should all paint better portraits if we didn't care a d—n for our sitters. Suppose now when a patron calls to order a portrait, I should say, 'I will not take your commission in the usual form, but I will hire you to sit and pay you one dollar an hour, and if you like the picture when I call it done, you can have it for a stated price, and if you don't like it you needn't take it; and there will be no favor either way.' With a sitter on such terms I think I could turn out something pretty good. I know I should have a good time. I'd manipulate him just as the barber does his victim, and if he dared to open his head about art or anything improving, I'd stop his yop with a paint-brush. I'd just have my way till I got through, and then he could have his — take it or leave it." — *From a Letter to the Boston Transcript.*

An Asphalt Mortar.— The *Centralblatt der Bauverwaltung* describes a patented composition made at a factory in Stargard, Pomerania, which has for some years past been used with perfect success on the Berlin-Stettin railway for wall copings, water-tables and similar purposes requiring a waterproof coating. The material is composed of coal-tar, to which are added clay, asphalt, resin, litharge and sand. It is, in short, a kind of artificial asphalt, with the distinction that it is applied cold like ordinary cement rendering. The tenacity of the material when properly laid, and its freedom from liability to damage by the weather, are proved by reference to an example in the coping of a retaining-wall which has been exposed for four years to the drainage of a slope 33 feet high. This coping is still perfectly sound and has not required any repair since it was laid down. Other works have proved equally satisfactory. In applying this mortar, as it is termed, the space to be covered is first thoroughly dried, and after being well cleaned is primed with hot roofing varnish, the basis of which is also tar. The mortar is then laid on cold, to the thickness of about three-eighths of an inch, with either wood or steel trowels, and is properly smoothed over. If the area covered is large, another coating of varnish is applied and rough sand strewn over the whole. The waterproof surface thus made is perfectly impregnable to rain or frost, and practically indestructible. The cost of the material laid is estimated at not more than 5*d*. per square foot, and it is stated that this price can be reduced by at least 1*d*. for large quantities put down by experienced workmen.

The Subterranean Quarries of Paris.— Frequent instances of subsidence of the surface soil having occurred in several quarters of Paris, the municipal authorities are bestirring themselves with a view to consolidating the sub-soil of the capital. A plan of the great subterranean quarries that extend under the Bois de Vincennes and the neighboring districts has been prepared, and the necessary work to be undertaken has been settled. The first portion, which consisted of strengthening the quarries under various public thoroughfares in the 13th, 14th, 15th, and 16th arrondissements, over a total length of 2,000 yards, is already finished. In many places it was found absolutely necessary to construct piers, and fill in the spaces between them with ballast, etc. No less than 6,280 cubic metres of masonry and 10,700 metres of earth and sand were used, while the cost of this comparatively small section amounted to about 10,000*l*. It is expected that the complete execution of the work will necessitate an expenditure of many millions of francs. — *The Architect.*

Filtering Sewage at Liege.—In Liege a company has been formed to purify sewage by filtering it through slag made in the manufacture of mild steel. It is said that the slag can afterwards be made available as manure.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

269,177. LEAD TRAP OR CESSPOOL. — Alexander Chapman, Montreal, Quebec, Canada.

269,180. FIRE-ESCAPE. — Lewis Coller, Flint, Mich.

269,197-205. AUTOMATIC FIRE-EXTINGUISHER. — Frederick Grinnell, Providence, R. I.

269,219. PLASTERING COMPOUND.—Mark W. Marsden, Pittsburgh, Pa.

269,223. OUTLET FOR TANKS OF STEAM-HEATING APPARATUS. — Eugene F. Osborne, St. Paul, Minn.

269,224. STEAM-PIPING FOR BUILDINGS. — Eugene F. Osborne, St. Paul, Minn.

269,226. SYSTEM FOR EXTINGUISHING FIRE AUTOMATICALLY.—Henry S. Parmelee, New Haven, Conn., and Frederick Grinnell, Providence, R. I.

269,227. AUTOMATIC FIRE-EXTINGUISHER.—Henry S. Parmelee, New Haven, Conn.

269,234. PIPE-WRENCH. Edwin A. Robbins, Boston, Mass.

269,236. VENTILATING DEVICE. — Sumner Shaw, Boston, Mass.

269,246. PORTABLE WATER-CLOSET. — George E. Waring, Jr., Newport, R. I.

269,268. FIRE-ESCAPE. — Oscar F. Davis, Topeka, Kans.

269,272. SHINGLE-SAWING MACHINE. — Aaron Emerick, Johnsburg, Pa.

269,273. ELECTRIC FIRE-ALARM AND EXTINGUISHER. — Clarence A. Evans, Upland, Pa.

269,280. CONCRETE ARCH FOR SIDEWALKS AND OVER AREAS. — George Goodman, San Francisco, Cal.

269,292. ILLUMINATING BASEMENTS. — Peter H. Jackson, San Francisco, Cal.

269,297. METALLIC ROOFING.— Harrison E. Kozer, Waynesburgh, Pa.

269,330. MANTEL AND STOVE COMBINED.—William Schmitz, Waterbury, Conn.

269,363. VENEER MACHINE. — William H. Williams, Long Island City, N. Y.

269,372. WINDOW GUARD.—Jonathan Badger, New York, N. Y.

269,377. FIRE-ESCAPE. — Vital Bessler, New York, N. Y.

269,406. AUGER.—Porter A. Gladwin, Boston, Mass.

269,409. OIL-STONE HOLDER. — Frank H. Gowell, Boston, Mass.

269,411. SPRING-HINGE.—Henry C. Hart and James W. Cross, Detroit, Mich.

269,421. LOCKING-LATCH. — Joshua B. Hutson, Richmond, Va.

269,451. STONE-CUTTING MACHINE. — Marvin S. Otis, Rochester, N. Y.

269,452. WINDOW-SCREEN. — Isaac E. Palmer, Middletown, Conn.

269,482. WRENCH. — Loyd H. Swan, Oxford, Ind.

269,508. DOOR-HANGER. — Frank Birmingham, Hornellsville, N. Y.

269,516. KNOB-ATTACHMENT. — Jacob G. Fox, Bay City, Mich.

269,531. FAUCET. — James McGinley, Chicago, Ill.

269,536. PORTABLE MANTEL FOR FIREPLACES. — Charles L. Page, Chicago, Ill.

269,551. FIRE-BACK. —Nicholas B. Thweatt, Hickory Plains, Ark.

269,562. ADJUSTABLE STOP-HINGE. — Thomas H. Costello, and Arthur H. Hall, Chicago, Ill.

269,578. SPEAKING-TUBE.— Joseph Ireland, Cleveland, O.

269,591. PAINT-OIL. — John Manning, New York, N. Y.

269,593. ELECTRIC SAFETY APPARATUS FOR THEATRES AND OTHER BUILDINGS. — Charles A. Mayrhofer, Vienna, Austria-Hungary.

269,601. DRAWING-BOARD. — Annie H. Sinclair, Philadelphia, Pa.

269,648. DEVICE FOR WASHING A COMBINED URINAL AND PRIVY-COVER. — Sigmund Edinger, New York, N. Y.

269,686. LATHE. — Jacques Laurent, Philadelphia, Pa.

269,687. FAUCET. — Henry B. Leach, Boston, Mass.

269,690. BOILER AND FURNACE. — James H. McIntosh, Paterson, N. J.

269,703. CURTAIN-FIXTURE. — William H. Paulding, Peekskill, N. Y.

269,709. VISE. — Henry F. Read, Brooklyn, N. Y.

269,715. FIRE-ESCAPE. — Charles Roberts, Montgomery City, Mo.

269,719. DRAFTING-INSTRUMENT. — Henry C. Root, San Francisco, Cal.

269,728. CROSSCUT-SAW. — George F. Simonds, Fitchburg, Mass.

269,740. WINDOW-PANE. — Theophilus Tanner, Osage, Neb.

269,744. KEY-FASTENER. — Edward K. Tolman, Worcester, Mass.

269,772. MANTEL AND FRONT. — Frederick Woolfenden and Herbert L. O'Brien, Detroit, Mich.

269,775. SAFETY APPLIANCE FOR LIFTS, ELEVATORS, AND DUMB-WAITERS. — Arnont Cannon, Jr., Poughkeepsie, N. Y.

269,776. BRAKE FOR ELEVATORS OR DUMB-WAITERS. — George W. Cannon, Poughkeepsie, N. Y.

269,778. LEAD-PENCIL. — George H. Dougherty, Jersey City, N. J.

269,784. SOLDERING-TOOL. — Maximilian F. Haber, Baltimore, Md.

269,785. MANUFACTURE OF PAPER-BOARD. — Silas H. Hamilton, Lawrence, Kan.

269,786. APPARATUS FOR MANUFACTURING BUILDING-BOARD FROM PAPER.— Silas H. Hamilton, Lawrence, Kan.

269,799. LOCK-STRIKE. — Robert Lee, Cincinnati, Ohio.

269,806. DOOR CHECK AND HOLDER. — George A. McArthur, Chicago, Ill.

269,815-817. MANUFACTURE OF PAPER-BOARD. — Silas H. Hamilton, Bushnell, Ill.

269,818. MANUFACTURE OF DOORS FROM PAPER.— Silas H. Hamilton, Bushnell, Ill.

10,264. (*Reissue.*) TRANSOM-LIFTER. — John F. Wollensak, Chicago, Ill.

SUMMARY OF THE WEEK.

Baltimore.

HOUSES. — Eight three-st'y and attic dwells., 18' 6" x 79', on Preston St, between Maryland Ave. and Charles St., for Enoch Pratt; Geo. J. Zimmerman, builder; W. H. Marriott, architect.

BUILDING PERMITS. — Since our last report three permits have been granted, which are as follows: —

C. Meiner, two-st'y brick addition to No. 98 Granby St., n s, between Canal and Exeter Sts.

C. Oelrich, two-st'y brick stable, in rear of No. 155 Eden St., w s, between Bank St. and Eastern Ave.

C. Eppler, one-st'y brick addition, 16' x 32', in rear of No. 62 Conway St., n s, between Howard and Sharp Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Lime St., No.* 14, Ward 9, for Daniel Gregory, three-st'y flat stable, 20' x 64, S. B. Bennett, builder.

Beacon St., No. 322, rear, Ward 11, for R. D. Evans, one-st'y flat stable, 26' 6" x 32' 6"; Woodbury & Leighton, builders.

Gloucester St., Nos. 48-56, Ward 11, for Vinal & Dodge and George Wheatland, Jr., 5 two-st'y mansard dwells., 22' 3" x 42'; Vinal & Dodge, builders.

Marlborough St., No. 191, Ward 11, for Samuel T. Ames, three-st'y mansard dwell., 24' x 62'.

Marlborough St., No. 336, Ward 11, for Samuel T. Ames, two-st'y mansard dwell., 23' x 42'; Samuel T. Ames, builder.

Wood. — *East First St., Nos.* 478-480, Ward 14, for A. M. Stetson & Co., one-st'y flat lumber-shed, 52' x 53'; one-st'y flat storage, 15' x 25', and 39 'x 36'; Holbrook & Harlow, builders.

Unnamed Pl., from Fremont Court, Ward 24, for Byron A. Atkinson, one-st'y mansard stable, 23' x 26'; Freman Hopkins, builder.

Blake St., near Boston St., Ward 15, for Mrs. Annie Fryer, one-st'y pitch stable, 17' x 20'; Alexander M. Fryer, builder.

Downer Ave., near Dellolf St., Ward 24, for Mrs. E. L. Burdett, two-st'y pitch dwell., 27' 6" x 30'; Edw. McKechnie, builder.

Paris St., No. 115, Ward 2, for Frank W. McCausland, one-st'y pitch carriage-house, 30' x 50'.

Newman Pl., near Dudley St., Ward 20, for Leander B. Abbott, four-st'y flat dwell., 36' x 37'; L. B. Abbott, builder.

Brooklyn.

BUILDING PERMITS. — *Park Ave.*, s s, 215' e of Nostrand Ave., 7 two-st'y frame tenements, gravel roofs; cost, each, about $2,500; owner and builder, Julius C. Hommel, 61 Cook St.; architect, F. F. Thomas.

South Fifth St., No. 323, n s, 80' e Ninth Ave., four-st'y brownstone front flat, tin roof; cost, $7,000; owner and builder, George Lehrian, 231 South Fifth Ave.; architect, T. Englebardt.

Clifton Pl., s s, 260' w Nostrand Ave.; 3 two-st'y with three-st'y rear brownstone front dwells., tin roofs; cost, each, $4,500; owner and builder, A. Miller, 373 Decatur St.; architect, T. Miller.

Nevins St., w s, between Sackett and Degraw Sts., one-st'y brick engine-house, slate roof; cost, $8,000; owners, The Fulton Municipal Gas Company, 342 Fulton St.; architect, J. F. Harrison; builder, R. Deeves.

Bushwick Ave., e s, between Vanderveer and Hull Sts., two-st'y frame hotel; cost, $6,000; owner, Joseph Boyer; architect, J. Platte; builders, C. Brown and N. McCormack.

Montieth St., No. 32, three-st'y frame double tenement, tin roof; cost, $4,000; owner, Henry Strebeng, 30 Monteith St.; builder, H. Kempf.

India St., No. 156, three-st'y frame double tenement, tin roof; cost, $3,500; owners, Clarkson, Warren & Co., 1577 Atlantic Ave.; architect; W. Wright; builder, G. W. Philips.

Dean St., s s, 200' e Washington Ave., 2 three-st'y frame tenements, tin roofs; cost, each, $4,000; owner, Thomas Monahan, on premises; builder, I. D. Reynolds.

Oakland Ave., n e cor. Ash St., one-st'y frame storage-shed, gravel roof; cost, $4,000; owner, Church & Co., 112 Milton St.

Macon St., n s, about 250' w Reid Ave., 6 two-st'y brick dwells., stone fronts, tin or gravel roofs; cost, each, $4,500; owner, Henry A. Foster, Lexington Ave., n w cor. One Hundred and Third St., New York; architect, J. E. Styles.

Bushwick Ave., No. 788, two-st'y frame tenement, tin roof; cost, $4,500; owner, Sarah Goodwin, on premises; architect, F. Webber; builder, B. Goodwin.

Chicago.

BUILDING PERMITS.—C. Warrington Earle, three-st'y and basement brick dwell., 25' x 70', 535 Washington Boulevard; cost, $14,000.

O. M. Brady, 2 two-st'y brick dwells., 47' x 60', Erie St. and Western Ave.; cost, $10,000.

Wm. Schwerin, one-st'y brick cottage, 20' x 50', 977 Twenty-first St.; cost, $1,500.

Albert Crane, 5 one-st'y cottages, 20' x 30' each, Dashiel St., near Twenty-ninth St.; cost, $2,000.

Howard & Crowhurst, 2 one-st'y brick cottages, 20' x 42', 605 and 607 Thirty-second St.; cost, $3,000.

M. J. Schwertek, three-st'y and basement brick store and flats, 25' x 67', 617 N. Clark St.; cost, $9,000.

A. Pelke, one-st'y brick cottage, 20' x 50', 251 W. Thirteenth St.; cost, $1,000.

J. V. Farwell, four-st'y and basement brick factory, 50' x 100', 116 to 118 Illinois St.; cost, $20,000.

F. D. Reynolds, 3 three-st'y and cellar brick dwells., 60' x 68', 3731 to 3735 Vincennes Ave.; cost, $10,000.

E. S. Warren, two-st'y brick dwell., 25' x 65', 168 Aberdeen St.; cost, $8,000.

John Anderson, two-st'y and basement brick dwell., 405 Taylor St.; cost, $4,000.

C. Shade, one-st'y brick store, 20' x 32', 189 Larrabee St.; cost, $700.

Sophia Wixtrom, three-st'y and cellar brick flats, 23' x 50', 166 Schiller St.; cost, $5,000.

F. A. Williams, two-st'y and basement brick dwell., 22' x 40', 133 Lincoln Ave.; cost, $5,000.

C. Stiffel, two-st'y brick dwell., 21' x 32', 28 Samuel St.; cost, $2,000.

Turner & Bond, 5 one-st'y brick cottages, 20' x 30' each, Butler St., near Twenty-ninth St.; cost, $4,000.

James Schwartgendate, two-st'y and basement brick addition to dwell., 21' x 30', 40 Clybourn Ave.; cost, $4,000.

Miss E. S. Merriman, three-st'y and cellar brick flats, 23' x 72', 113 South Hoyne Ave.; cost, $7,000.

Agnes Irons, 6 two-st'y brick dwells., 21' x 40' each, Laflin and Monroe Sts.; cost, $15,000.

Wm. Hennig, three-st'y and basement brick warehouse, 24' x 56', 115 North Ave.; cost, $3,500.

Cincinnati.

BUILDING PERMITS. — Clara L. Betts, two-st'y frame dwell., Spring Grove Ave.; cost, $2,000.

M. M. Kleeman & Son, four-st'y brick dwell., 14 Fulton Ave.; cost, $5,000.

A. E. Smith, three-st'y brick dwell., No. 87 Richmond St.; cost, $5,000.

E. Schilling, 3 four-st'y dwells., cor. of Oak and Buckeye Sts.; cost, $15,000.

Louis Fay, two-st'y brick dwell., No. 603 Elm St.; cost, $2,500.

Mary Wehman, two-st'y frame dwell., Hoffner St., near Apple St.; cost, $2,500.

Wm. Riefler, three-st'y brick dwell., McMillan St., between May and Spring Sts.; cost, $7,000.

Three permits for repairs; cost, $3,000.

Total permits to date, 660; total cost to date, $1,952,300.

Detroit.

BUILDING PERMITS. — The following permits have been granted since our last report:—

A. Beabon, frame house, Stimson Pl.; cost, $4,000.

H. Stringer, 3 frame houses, No. 199 Baker St.; cost, $4,500.

Dewey & Abell, brick dwell., No. 574 Third Ave.; cost, $3,200.

E. B. Taber, frame house, No. 985 Gratiot Ave.; cost, $3,500.

W. A. Edwards, brick dwell., No 31 Peterboro St.; cost, $4,500.

Kirckner & Co., brick addition to house, Howard St.; cost, $3,000.

A. Reaton, double frame house, Third Ave.; cost, $4,500.

M. A. Edwards, 2 brick houses, No. 33 and 35 Peterboro St.; cost, $9,000.

E. Mayhew & Son, frame house, Brainard St.; cost, $3,000.

J. D. Standash, brick store, Michigan Ave.; cost, $5,000.

A. E. French, brick dwell., No. 817 Jefferson Ave., cost, $15,000.

A. Chapoton, brick dwell., No. 561 Woodward Ave.; cost, $15,000.

A. Chapoton, double brick dwell., East Larned St.; cost, $5,000.

Hargraves Manufacturing Co., additions to factory, Eighteenth St.; cost, $3,600.

A. C. Varney, brick house, East Montcalm St.; cost, $3,700.

A. C. Varney, brick warehouse, Columbia St.; cost, $8,000.

John Booberitz, brick house, Gratiot Ave.; cost, $5,000.

John Boeberitz, brick school-house, Chene St.; cost, $3,000.

J. B. Wilson, brick building, West Fort St.; cost, $5,000.

New York.

THEATRES. — The "Alcazar," formerly the "Metropolitan Casino," is to be again altered, this time into a theatre; Mr. Henry J. Dudley will be the architect.

Mr. McKee Rankin is to have a theatre, to seat nineteen hundred persons, built on the land recently leased by him on the cor. of Third Ave. and Thirty-first St.; it will cost over $150,000.

CARRIAGE REPOSITORIES. — Two carriage-repositories, each 50' x 90', five-st'y, of Philadelphia face-brick with Ohio-stone finish, are to be built from designs of Mr. Jos. M. Dunn: one for Mr. Wm. H. Gray, on Seventh Ave., between Fifty-third and Fifty-fourth Sts., to cost $32,000; and the other on Forty-seventh St., between Eighth and Ninth Aves., for Mr Jno. R. Thurber, for occupancy by Messrs. Brewster & Co., to cost $35,000.

HOUSES. — A handsome residence, 50' x 65', with extensions, to be built of Bedford stone, richly carved and in the French Gothic style, is to be built on Fifty-seventh St., between Fifth and Sixth Aves., for Mr. J. Rothschild, at a cost of about $250,000, from designs of Messrs. Youngs & Campbell.

BUILDING PERMITS. — *West Forty-first St., Nos.* 311 *and* 313, six-st'y brick store, tin roof; cost, $25,000; owner, Eliza J. Hays, 1327 Second Ave.; architect, T. G. Smith.

Seventh Ave., w s, 50' 2" n Fifty-third St., five-st'y brick carriage-repository, tin roof; cost, $32,000; owner, Wm. H Gray, 258 West Fourth St.; architect, Jos. M. Dunn; mason, John Demarest.

Eighty-sixth St., n s, 150' e Ave. A, five-st'y brick tenement, tin roof; cost, $18,000; owner, John H. Sturk, 174 East Eighty-seventh St.; architect, John C. Burne.

Seventy-sixth St., s s, 105' w Second Ave., 2 five-st'y brick tenements, tin roofs; cost, each, $16,500; owner, John J. McDonald, 1321 Park Ave.; architect, John Brandt.

Tenth Ave., w s, 50' n One Hundred and Fifty-eighth St., three-st'y brick store and dwell., tin

roof; cost, $6,000; owner, Wm. Deppermann, Tenth Ave., between One Hundred and Fifty-eighth and One Hundred and Fifty-ninth Sts.; architect, Julius Boekell.

Bowery No. 123, five-st'y brick store, tin roof; cost, $23,000; owner, Paff estate; lessee, Mary Anderson, Newark, N. J.; architect, Jas. S. Wightman; builder, D. C. Weeks & Son.

West Thirteenth St., No. 20, one-st'y brick boiler-house, gravel roof; cost, $2,500; owner, Emile Beneville, 414 East One Hundred and Sixteenth St.; architect, Paul F. Schoene.

One Hundred and Forty-ninth St., n s, 155′ e of Robbins Ave., three-st'y frame dwell., tin roof; cost, $2,500; owner, Chr. Cassens, Westchester Ave., near Brook Ave.; architect, Wm. McIntyre; builder, James McAllister.

Madison Ave., n w cor. of Fifty-ninth St., nine-st'y brick flat, tin roof; cost, $200,000; owner, Thos. Kilpatrick, 60 East Fifty-eighth St.; architects, Charles W. Romeyn & Co.

Sixty-second St., s s, 200′ w of Ave. A, one-st'y brick workshop, tin roof; cost, $3,000; owner, T. J. Sheridan, 226 East Eightieth St.; builders, Patrick Sheehy and owner.

Old Slip, four-st'y brick building for Police Department, tin roof; cost, $100,000; owner, City of New York.

Madison Ave., w s, 150′ s of One Hundred and Seventy-fourth St., two-st'y and attic frame dwell., shingle roof; cost, $5,000; owner and builder, R. S. Guernsey, Tremont.

Baxter St., w s, 54′ s of Walker St., 2 three-st'y brick dwells., tin roofs; cost, $5,000 and $6,000; owner, John Hooper; lessee, Jacob Cohen, cor. Walker and Baxter Sts.; architect, John Brandt.

West Twenty-third St., No. 525, two-st'y brick workshop, gravel roof; cost, $4,000; owner and carpenter, George Collins, on premises; mason, not selected.

Forty-seventh St., n s, 200′ w of Eighth Ave., five-st'y brick factory, tin roof; cost, $35,000; owner, John R. Thurber, 146 West Twelfth St.; architect, Jos. M. Dunn; builders, L. N. Crow, and McGuire & Sloan.

Alterations.—*East Fourteenth St., No.* 44, put in elevator; cost, $6,500; owners, Wheeler & Wilson Manufacturing Co.; builders, Monk & Brauwer.

Clinton Place, No. 124, new front and internal alterations; cost, $2,000; owner, Mrs. Josephine Hyslop; lessee, H. B. Wiggin; architect, George Cook; builders, Cook & Berryman.

Sixty-fourth St., s s, 244′ w of Ave. B, move building to front of lot and repairs; cost, $2,500; owner, John D. Crimmins, 40 East Sixty-eighth St.

East Twenty-third St., No. 18, is to be altered into a store, at a cost of about $10,000, from designs of Messrs. D. & J. Jardine.

Alterations.—*West Third St., No.* 1, raise attic to full story, new store-front; cost, $3,000; owner, Ed. P. Dickie, 47 West One Hundred and Twenty-sixth St.; architect, Chas. E. Hadden.

Philadelphia.

Houses.—At Thirty-fourth St. and Powelton Ave., T. J. Lewis and George Burnham, Jr., are about to build 2 three-st'y dwells., 15 rooms each, at a cost of $12,500 each.

The Year's Work.—The number of building permits issued during 1882 was 3,185, an increase over 1881 of 504 permits.

Building Permits.—*Chestnut Ave.*, s s, e of Main St., three-st'y dwell., 22′ x 73′; Tourlson Bros., contractors.

Venango St., 20′ w of Third St., two-st'y dwell., 18′ x 40′; Aug. Searle, owner.

Delaware Ave., cor. Almond St., mill and filter house, 106′ x 291′; Havemeyer & Co., owners.

Gray's Ferry Road, bet. Twenty-ninth and Thirtieth Sts., one-st'y boiler house, 60′ x 76′; Henry Bower, owner.

McKean St., s s, 18′ w of Eighth St., two-st'y dwell., 15′ x 42′; C. Petzolb, owner.

Mildred St., s w cor. McLean St., 2 two-st'y dwells., 17′ x 42′; J. C. D. Smith, contractor.

St. Louis.

Building Permits.—Twenty-three permits have been issued since our last report, of which six are for unimportant frame houses. Of the rest those worth $2,500 and over are as follows:—

Wyoming St., bet. Missouri and Illinois Aves., two-st'y brick dwell; cost, $2,700; Adam Rosner, owner; T. Knittel, builder.

Main St., bet. Loughborough and Quincy Sts., two-st'y brick dwell.; cost, $2,600; H. Haas, owner; J. S. Parks, builder.

Chestnut St., bet. Garrison and Cardinal Aves., 8 three-st'y stone front dwells; cost, $5,000; D. M. Houser, owner; C. E. Illsley, architect; J. H. Dunlap, builder.

Poplar St., bet. Twentieth and Twenty-first Sts., one-st'y brick warehouse; cost, $5,000; Union Depot Shipping and Storage Co., owners; S. W. E. Bent, builder.

St. Ange Ave., bet. Park Ave. and Hickory St., two-st'y brick dwell.; cost, $3,550; Horn, owner; J. A. Stanton, builder.

Bids and Contracts.

Indianapolis, Ind.—The City-Hall Commissioners have received bids for contracts for the erection of the new city-hall and market-house, the plans for which include a large hall capable of accommodating seven thousand persons. There were six bidders, namely: Peter Routher, $175,000; Shover & Chusham, $184,751; Youngdans & Shumaker, $178,480; J. Buchanan, $215,000; J. L. Fatout, $165,000; M. K. Fatout, $149,460. The lowest bid will be reported to the City Council for its action. A bond of $50,000 is offered that the building can be put up for the amount named in conformity with the plans and specifications.

General Notes.

Grand Rapids, Mich.—Edwin F. Uhle has commenced building a house on Fountain St.; cost, $18,000.

William Thum is building a three-st'y brick block on West Bridge St., 24′ x 100′; cost, $8,000.

Mr. McLane has commenced building a block of two stores, each 20′ x 80′, two stories, cor. Wealthy Ave. and Division St.; cost, $5,000.

The Cornell Manufacturing Co. is building a large factory for the manufacture of wind-mills, on Berkley Ave.

The Folding Chair and Table Co. is building a four-st'y factory, corner of Zonia St. and Wealthy Ave.

J. F. Ferris is building a wooden house on Madison Ave.; cost, $3,500; Robison & Barnaby, architects.

Fred Maynard is building a cottage on Bostwick St.; cost, $3,000; Robison & Barnaby, architects.

J. W. Converse has commenced the erection of a three-st'y brick block on Front St.; cost, $8,000.

The city of Grand Rapids is soliciting plans for a fourteen-room school building, to cost from $20,000 to $25,000.

George Davidson is preparing to build a brick house; cost, $3,500; D. S. Hopkins, architect.

Mr. Nelson W. Northrop is having plans prepared for a wooden house on Union St.; cost, $2,500; D. S. Hopkins, architect.

Dowagiac, Mich.—C. W. Defendorf is having plans prepared for a house to cost $4,500; D. S. Hopkins, architect, Grand Rapids, Mich.

Flatbush, N. Y.—Robert S. Walker, 137 Broadway, is having plans prepared for a dwelling to be built at Flatbush, near Prospect Park; cost, $4,500; D. S. Hopkins, architect, Grand Rapids, Mich.

Babylon, N. Y.—Ten cottages are to be built on the Argyle Hotel grounds at a cost of from $3,500 to $4,000 each, for Austin Corbin and others, from designs of Messrs. Price & Freeman of New York.

Seabright, N. J.—A frame casino, to cost about $20,000, is to be erected from designs of Messrs. Price & Freeman, of New York.

Hartford, Conn.—A car-house, office and stables for the Hartford & Wethersfield Horse Railroad Co., is now building on Vernon St. It is of brick, measuring 144′ x 154′, and will cost $25,000; Mr. H. B. Philbrick is the contractor; Mr. John C. Mead is the architect.

Poquonnock, Conn.—The town-hall is now building from the plans of Mr. John C. Mead, architect, of Hartford. The building is Renaissance in style, of brick, 46′ x 82′; cost, $15,000; Messrs. Cotter & Laverty, of Poquonnock, are the contractors.

Glen Cove, N. Y.—A house and stable to cost about $18,000 will be built on Long Island Sound between Glen Cove and Sands Point, for Mr. Louis Hammersley from designs of Messrs. Price & Freeman.

Larchmont, N. Y.—A $20,000 stone and tile residence is to be built for Mr. C. D. Shepard from designs of Messrs. Price & Freeman, of New York.

Hoboken, N. J.—Some important improvements are being designed by Mr. H. Edwards Ficken, of New York.

The Duke house is to be remodelled, and several stores with apartments above are to be erected.

Bellamy Mills, N. H.—W. P. Hayes & Son are building a large dry goods house, 40′ x 100′, for their extensive business.

Manchester, N. H.—The Amoskeag corporation are making arrangements for building a boiler-house on the west side of the river, 50′ x 275′; a chimney 250 feet high, the steam to be conducted across the river, in two cast-iron pipes. It is the intention of the company to build an engine-house between mills Nos 4 and 5.

Sunapee, N. H.—The town has voted to exempt from taxes any new buildings and business, or business put into buildings now unoccupied, to the amount of $5,000 or more for ten years.

Kingsessing, West Philadelphia, Pa.—On Springfield and Chester Avenues there will be built a number of dwellings at a cost of $5,000 to $7,000 each; Thomas Robb, owner.

Media, Pa.—Wm. H. Miller is about to build a three-st'y dwelling, to be of brick and stone, to cost about $25,000.

Xenia, O.—School-house; cost, $48,000; W. R. Brown, architect, Cincinnati, O.

Lockland, O.—School-house; cost, $18,000; W. R. Brown, architect, Cincinnati, O.

Dayton, O.—Odd Fellows Hall; cost, $7,000; W. R. Brown, architect, Cincinnati, O.

Easton, Penn.—The Slate Exchange of Lehigh and Northampton Counties yesterday reduced the prices of ribbon slate 25 cents a square to wholesale dealers, but not to roofers. This is to be the scale of prices for the next six months. Prices for other slate remain unchanged.

Fall River, Mass.—It appears that there is some opposition to the re-building of the Flint mill by a number of the stockholders.

Thompsonville, Conn.—The Methodists have decided not to build a new church at once, but to solicit subscriptions, and when a sufficient sum is paid in the new building will be started.

Summit, N. J.—A frame residence with open English timber work is to be built for Mr. W. H. De Forest from designs of Messrs. Lamb & Rich, of New York.

Saugerties, N. Y.—A handsome brick, stone and wood house, to cost about $30,000, is to be built for Mr. Wm. R. Sheffield from designs of Mr. A. H. Thorp, of New York.

Yonkers, N. Y.—Mr. F. O. Neill is to have additions made to his house, to cost $10,000, from designs of Mr. Jos. M. Dunn, of New York.

Hoboken, N. J.—A Jewish synagogue is to be built at an early date; the site has not yet been selected.

COMPETITION.

A $3,000-HOUSE.

The subject of the next competition is one which is of the widest possible interest—a cheap dwelling; and we trust that more than the usual number of designs will be submitted in competition.

PROGRAMME.

The house is intended for a clerk who has a salary of only $1,500, but whose social position is unexceptionable, and he consequently hopes to be able to build for the $3,000, which economy has placed at his

PROPOSALS.

command, a house in harmony with the tastes and habits formed during bachelorhood. He is now married, and has two children who must be provided for in the planning, as also the maid-of-all-work.

The material of the building, size, number, and distribution of the rooms are left to the competitors to determine, who are to be guided solely by the cost, which must approximate $3,000.

Required: — Plans of each floor, a perspective sketch, and an elevation of one of the sides not shown in the sketch, also all necessary details to a larger scale, and at least one sketch of some feature of interior arrangement.

Also, a skeleton specification of the briefest possible dimensions, enough merely to give a clue to the character and quality of the work. Also a bill of quantities giving the actual number of yards of excavation, perch of stone-work, MM of brick, laths and shingles feet of lumber, window-sashes, doors, nails, hardware fittings, special fixtures, labor, etc., giving the present market price for the locality on each item, and reckoning-in the proper amounts for waste and allowances of all kinds, including the builder's profit and the architect's commission. Those who can secure actual estimates from reliable builders are urged to do so.

The specification and bill of quantities are to be submitted on paper of the size of legal cap, and the drawings upon two sheets, each measuring 14″ x 22″ within the framing line.

All drawings must be received at the office of the *American Architect*, on or before Saturday, January 13, 1883.

For each of the three designs of highest merit a prize of seventy-five dollars will be paid.

PROPOSALS.

COURT-HOUSE. [At Charlotte, Mich.]

In consequence of the destruction of the plans for Eaton County Court-House, by the burning of the architect's office in Hall Block, Toledo, O., the date of the letting of the contracts is postponed to January 24, 1883. D. W. GIBBS & CO., Architects.

CATTLE-SHEDS. [At Waltham, Mass.]

Office of Collector of Customs, Boston, Mass.

Sealed proposals will be received at this office **until 12 m., on the 12th day of January, 1883**, for erecting at the quarantine station at Waltham, Mass., two large, two medium and two small-sized sheds, including fencing for lots, in accordance with the drawings and specification.

Copies of the specification and any additional information may be obtained on application at this office, where the drawings can be seen.

R. WORTHINGTON, Collector of Customs.

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HOT-WATER HEATING-APPARATUS. [At Charleston, W. Va.]

Office of Supervising Architect, Treasury Department, Washington, D. C., December 30, 1882.

Sealed proposals will be received at this office **until 12 m., on the 23d day of January, 1883**, for furnishing and fixing in place complete, in the court-house and post-office building at Charleston, W. Va., a low-temperature hot-water heating-apparatus, in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL, Supervising Architect.

368.

WIRE, SPIKES, NAILS, IRON, ETC. [At St. Louis, Mo.]

United States Engineer Office, 404 Market St., St. Louis, Mo., December 15, 1882.

Sealed proposals in duplicate will be received at this office **until 12 o'clock, m., on January 15, 1883**, for furnishing and delivering at the U. S. Engineer Depot, foot of Arsenal St., in St. Louis, Mo., the following supplies for use in improving the Mississippi River below St. Louis, about

30,000 pounds best manilla bolt rope; 20,000 pounds sisal rope; 40,000 pounds annealed iron wire; 28,000 pounds spikes; 46,000 pounds round iron; 7,000 pounds sisal yarn; 2,000 pounds oakum; 3,500 pounds nails.

For blank forms for proposals and all necessary information, apply to

367 O. H. ERNST, Major of Engineers.

TIMBER. [At Chicago, Ill.]

U. S. Engineer Office, 25 Honore Building, Chicago, Ill., December 5, 1882.

Sealed proposals, in triplicate, will be received at this office **until 1 o'clock, p. m., Wednesday, January 10, 1883**, for furnishing pine and hemlock timber for breakwater construction at Chicago, Ill.

The total amount required will be about two and one-quarter million feet, B. M., to be delivered between the opening of spring navigation, or earlier, and September 1, 1883.

Parties who are not able to furnish the entire lot may submit propositions for a portion only, but for not less than two cribs.

For specifications, blanks for proposals, and all information apply to this office.

W. H. H. BENYAURD, Major of Engineers.

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(*Proposals continued on page ix.*)

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE tower of the great Norman Cathedral of Peterborough, in England, has recently shown such serious indications of decay as to make its demolition necessary. The tower is not very lofty, being but one hundred and fifty feet high above the pavement, but is one of the oldest portions of the building, and is naturally more exposed to deteriorating influences than the lower part. Most of our readers know something of the appearance of the Cathedral, with its splendid triple-gabled west front, and the round arches, with billet ornament, which characterize the interior. As a specimen of the English ecclesiastical architecture of the twelfth and early thirteenth centuries, such as it became in the hands of the great monastic orders, Peterborough is quite unrivalled; and although it is much to be regretted that anything of the original building should be lost, there is still enough left to exhibit the full grandeur of the style.

SOME criticisms have been made upon the plans for the new building of the Pension Bureau, to be erected on Judiciary Square in Washington, and the Commissioner of Pensions himself is said not to approve of them. Independent of the rather silly assertion made by some of the newspapers that the building will be "nothing but a pile of brick and mortar," just as if it needed to be anything more to combine all the excellences of the art of architecture, there is at least an appearance of reason in the opinion attributed to Mr. Dudley, that the arrangement of offices will be inconvenient. General Meigs's plan, which lies before us, contemplates, as our readers will remember, an immense hall, one hundred and sixteen by three hundred and sixteen feet, surrounded by a peristyle of seventy-six iron columns, supporting several stories of galleries, which give access to the various offices arranged around. Besides these small columns, the hall is crossed by two rows of larger ones, which carry a lantern light above. The motive of this arrangement was, as we understand, a desire on General Meigs's part to secure a spacious room which could be used for the various receptions and other assemblages which occur so often in Washington, and have been hitherto so wretchedly accommodated. Even the Capitol contains nothing but the small rotunda and a few scattered rooms to hold the concourse of people which fills it on state occasions, and the hall of the new Pension Office will be not only by far the best situated and most appropriate place in the city for such purposes, but will, by its vast dimensions and skilfully varied plan, form a most imposing and magnificent apartment. Whether it is worth while to sacrifice for this purpose any real convenience in the administration of the Pension Bureau is perhaps a doubtful question, but considering the value of the central hall for the purposes to which it will be appropriated, we connot see that any material advantage in the planning of the other rooms is neglected.

TWO deaths of persons of note in the architectural world are announced, one being that of Miss Rhoda Garrett, whose name is well known in this country. Miss Garrett was a woman of singular force and courage, as well as talent. Finding herself, on her arrival at the age of discretion, dependent upon her father, a poor country clergyman with a large family, she determined to do something to lighten his burden, and took the unusual step of entering an architect's office as a student, and afterwards as assistant. Having acquired the knowledge she needed, she went into business on her own account as a house decorator, taking into partnership her cousin, Miss Agnes Garrett. Notwithstanding the delicate health of one of the partners, the members of the new firm soon gained the respect and admiration of a large circle of clients and friends, among whom must be counted also the readers of the excellent little book on decoration prepared by the two cousins, and widely circulated on both sides of the Atlantic. The other death which requires notice is that of M. G. Bourgerel, who died recently at Nantes, France, at an advanced age. Although as departmental architect of Loire-Inférieure his professional employment was mainly confined to a poor and remote province, he had made for himself a European reputation by his beautiful sketches of ancient architecture, and his restorations of many of the more famous monuments. His book, the *Fragments d'Architecture Antique*, is well known in this country, and is perhaps the best work of the kind. This gained for him the high honor of an election as Corresponding Member of the Institute of France, and later, the gold medal of the Société Centrale was awarded to him in recognition of the superior beauty of his executed designs.

SOME remarks are made in a late number of the *Builder* in relation to the burning of the Alhambra Theatre, which should do much to comfort the American firemen who have felt aggrieved at the criticism of their methods indulged in by Captain Shaw. Speaking of the efforts of the fire-brigade, not to save the theatre, but to protect adjoining buildings, the account says that "this is evidently regarded as the best line of tactics to employ; and no wonder, considering the utter futility of the means at hand for doing anything to keep down the main conflagration." "To see the masses of flame within the theatre, and the jets of spray playing on them (for the column of water from the hose is broken into mere spray in its passage through the air) suggested a contrast almost ludicrous. One might as well think of putting out Pandemonium with a garden squirt." "Surely," the *Builder* continues, "it is time that some effort were made to place at our command a more effective weapon against fire than the fire-engine of the day furnishes." In the case of a large fire an immense amount of noise is made, the air filled with smoke, and the gutters with water, "but all the result is the pumping of a few showers of broken spray into the burning building, the effect of which upon the fire is absolutely *nil*." It is rather surprising to find an observant English journal repeating the very criticisms which are made by American experts upon the London system of fire extinction which Captain Shaw thinks so perfect, and the remedy which the *Builder* proposes, that of devising "means for throwing water in heavier and more solid streams," has long been successfully applied in this country.

CONSIDERABLE comment among builders and architects has been called out by the recent fires in ancient mansions in England, and one of the former—Mr. Thomas Potter,—has published in the *Builder* a very interesting paper in regard to them. In Mr. Potter's opinion many of the conflagrations in old houses are due to the presence of wood-bricks and bond-timbers in the masonry adjacent to flues. The latter, as is well known, were once much used, not only in England but in this country, while the former are often found to have been inserted in the front of chimney-breasts, perhaps disused at the time, for securing mirrors or wood finishings, and being afterwards forgotten, or plastered over, form a source of serious danger. In the case of timber near flues, the risk increases with the lapse of time, as the wood not only becomes more combustible by continued drying, but the mortar in the joints of the brickwork is slowly dissolved by the acid vapors in the smoke, and brushed away in the process of sweeping, leaving at last open passages for sparks to pass through. Another common cause of the burning of houses more than a hundred and fifty years old is found in the kindling of the wooden beams which were anciently used to support the front of chimney-breasts. As originally built, these beams were set about five feet from the floor, and were thus comparatively safe from over-heating, but many of the fireplaces in which they occur have been refitted for modern grates by building up the ancient opening with brickwork around the grates, leaving the wooden lintel undisturbed, to gather soot which may at any time take fire from a spark and kindle the timber.

A MEDICAL commission, which was appointed not long ago in Germany to study certain questions relating to the construction of school buildings, has made an interesting report, which must certainly be regarded as marking a step in advance in that branch of science. In the matter of ventilation we find that the members of the commission agree with all the other experts who have investigated the subject, in increasing the quantity of fresh air which is to be regarded as essential to health. It is but a very short time since a thousand feet of air per hour for each pupil was regarded as an extremely liberal theoretical allowance for healthy children, and in practice, in this country, at least, a room in which a hundred and fifty or two hundred feet per hour is actually supplied to each person is regarded as admirably ventilated. Now, however, those who have long submitted to be accused of foolish extravagance in insisting that this is an inadequate allowance may cite the authority of the German doctors, who set two thousand one hundred and twenty cubic feet per hour for each pupil as the *minimum* quantity of fresh air to be supplied. In the best arranged ventilating shafts, of metal, fitted with gas-flames, stoves or other artificial means for promoting the draught, the upward current will occasionally reach a velocity of a thousand feet per minute in cold weather, although the average is rarely more than five hundred feet, and generally much less; so that a room containing sixty pupils should have an outlet shaft of four square feet or more in sectional area to be even capable of such ventilation as is pronounced essential.

IN regard to lighting, the new commission totally denies and rejects the famous theory of unilateral illumination, following in this respect the French authorities, who began to call it in question a year or so ago. In the language of the report, it is *practically impossible*, even with lofty and narrow rooms, to obtain sufficient light by this method. In cases where openings can only be made in one wall, the report requires that the width of the piers between the windows shall not exceed three-fourths of that of the windows themselves, and that the width of the room shall not be more than five feet greater than the height of the windows, which would restrict it in such cases to about eighteen feet as a maximum. Lighting from two sides being then required under all ordinary circumstances, it is advised that the windows should be in the opposite walls, on the right and left of the pupils as seated. Light from the rear is admissible, but is not recommended, and windows facing the pupils are prohibited. Walls of neighboring buildings painted white and reflecting the sunshine into the school-room are very injurious, and the owners should be persuaded or obliged to paint them of a dark color. The inside face of the walls of the school-room itself is to be painted pale blue or bluish white, and the ceiling pure white. Artificial light should be used without hesitation on dark and short days; it is more dangerous to work by insufficient daylight than by gaslight. Argand burners are preferable as giving a steadier light, and ground-glass globes are objectionable on account of the large proportion of light which they absorb.

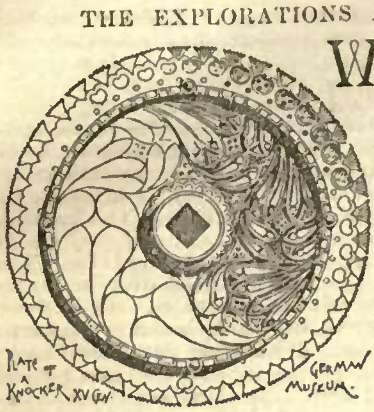
SOME details are given in the *Builder* of the discoveries made by Herr Humann at Pergamon, which prove to have been extremely interesting and valuable. So many portions of the ruined temple of Zeus have been recovered that the whole can be restored with certainty, and, by a happy inspiration, the special museum built at Berlin for the display of the remains has been so constructed as to reproduce the original temple, the marble fragments being inserted in their proper places. The arrangement of the interior, as positively determined by the explorers, differs from that of any other known temple. Apparently, Pergamon possessed a school of sculptors of which she was deservedly proud, and to afford the best possible facilities for observing the works with which the building was adorned, the interior of the cella, which seems to have been quite accessible to the public, was furnished with a sort of gallery, reached by a staircase behind the altar, by means of which the upper portions could be reached and closely examined. The decoration of the interior wall-surface of the cella consisted in a row of Ionic columns, or colonnettes, alternating with sculptured panels, and supporting a cornice, with an extremely rich sculptured frieze three hundred feet long, the fragments of which form the most important acquisition made by the expedition, and seem to be only second in value and interest to the unapproachable Elgin marbles.

THE subject represented on the frieze is the combat of the Titans and the Gods. The giants are shown under a variety of monstrous forms, some as sea-horses, some as human-headed serpents, and some as winged men, many of them with countenances distorted with rage and pain, and contrasting with the calm serenity which the Greeks always impressed upon their representations of the immortal deities. Among the more remarkable figures is one of a young Titan falling in agony at the foot of Athena, and encircled by the coils of a serpent, which is said to be absolutely identical in pose, gesture, and even in minute details, with one of the younger figures in the group of the Laocoön. The only difference is in the movement of the right arm, which was missing in the Laocoön group when discovered, and was restored by Montorsoli as we now see it, stretched upward, with the hand open and the fingers stretched out: in the Pergamon bas-relief, this arm is bent and drawn up close to the body, the hand almost touching the head. We know that the masterpieces of Grecian art were copied and re-copied by the sculptors of later days, and it is by no means improbable that the artist of the Laocoön, which is a work of comparatively recent date, may have at least derived a part of his inspiration from the ancient temple sculpture. The general style of the work is said to resemble that of the so-called Victory of Samothrace, now in the Louvre, and the well-known figure leading a bull, from the temple of the Wingless Victory at Athens. A single fragment, that of the head of a young girl, found near the temple, is said to recall the type of the Venus of Milo, which, as our readers will remember, so good an authority as Mr. Stillman conjectures to be no other than the veritable statue of the Victory herself, made wingless in order that she might never be able to desert the Athenians.

A NEW building now in process of construction in New York has a cellar which will alone cost, below the first-floor beams, about four hundred and thirty thousand dollars. Before commencing the building, the rock upon the lot was in some places twenty-five feet higher than the grade of the neighboring streets, and all this mass had to be cleared away before the excavation proper could begin. The average depth of the cellar below the curbstone grade is eleven feet, so that in many places thirty-six feet of rock was removed. The building itself covers eighty-one thousand square feet of land, and the excavation was carried out under the sidewalks all around to the curb, a distance of about fifteen feet. The cost of the excavation alone is estimated at one hundred and thirteen thousand dollars, and the foundation walls, concrete, drainage-works, and so on will be about three times as much more.

OBSERVATIONS made in South Australia seem to indicate that the influence of forests in increasing the total amount of rainfall on a large given area may not be so decided as has sometimes been supposed, but there is no doubt that the character of the deposition of water in wooded regions is much more gentle, and therefore fertilizing, than in denuded countries, where long droughts alternate with short but violent rains. In a limited territory the good effect of tree-planting is much more obvious, as the wooded area attracts to itself in frequent showers the moisture which would otherwise fall only in excessive rains, or might pass altogether beyond, to be deposited upon some mountain ridge affording the conditions necessary for condensation. In Egypt, for instance, which has from time immemorial been ranked as a rainless region, showers are now frequent, and the measured average rainfall on the Delta has increased from six to forty inches. This great change, which has brought the Egyptian climate from that of a desert to a degree of moisture equal to the average of England, can be accounted for only as the result of the planting of some twenty million trees by the three last viceroys of the country. In the United States, a considerable amount of prairie land in Southern Indiana and Illinois has, thanks to the improved watchfulness and care of its civilized owners, been successfully converted into forest, and the natural adaptation of the soil for this purpose is shown by the fact that in a single square mile of wood seventy-five species of trees, or almost as many as are found throughout the whole continent of Europe, were observed to be growing. These seventy-five species included nearly all the varieties of valuable timber trees known, and specimens of fifty-one of them were found which were estimated to be at least one hundred feet in height.

THE EXPLORATIONS AT ASSOS.[1] — III.



WE cannot give much space to descriptions of the other points of interest touched on in the report. There are many such points, but the greater part of this, the first report, is given up to the temple, as most of the first year's work has been; leaving the other buildings and remains of Assos to be described in later reports. The exploration has not been rich in the discovery of portable objects which can be carried home to adorn museums, but it has been none the less valuable for the uses of archæological study. Among the buildings of which are promised a fuller account is a stoa, an open portico nearly four hundred feet long, notched in under the brow of the acropolis, below the temple, and opening on a terrace which looked southward over the harbor and across the open strait to the island of Lesbos. About it are numbers of reservoirs and cisterns, to which the rather arid climate of Assos gave special value, and varied groups of ruined buildings, both ancient and mediæval. West of the stoa are the broad ruins, not yet fully examined, of what the explorers have tentatively called a gymnasium. Within it are to be seen the traces of a large building assumed to be a basilica, with an apse turned eastward, and showing interesting fragments of a pavement in colored mosaic with a rich border. Under the stoa, so placed that the lounger on the terrace could look down the ranges of sloping seats into the orchestra, is the theatre described by Hunt and Prokesch von Osten, its stage and orchestra apparently still visible, and the lower semicircles of seats, with the podium about the orchestra, displayed by a trial excavation. Scattered over the slopes are ruins of a variety of structures, porticos, possible temples, a domed Byzantine church, now used as a mosque (ingeniously described by an early French examiner as "a monument belonging to the great ages of Greece"), an agora, the remains of another Byzantine church, and at the bottom the little artificial harbor where the huge blocks of the ancient mole can still be seen under water, enclosing the inferior wall which the Turks have built within it. It would seem from the map which accompanies the report that the southern slope had been occupied by the public buildings of Assos, while the town of residences lay on the north of the acropolis, where the Turkish village of Behram makes it impossible to see what is beneath the surface.

Round the whole run the ancient walls, still in wonderful preservation, Mr. Clarke says, in spite of Turkish depredations since Texier's time, and easy to follow throughout almost the whole of their two miles of circuit. It is one of the purposes of the expedition to make a thorough examination of these walls, which are said to rival the famous walls of Syracuse as examples of ancient fortification. They are, according to Texier's report and Mr. Clarke's, built in squared coursed blocks of the reddish trachyte of the country, laid close, without mortar or cramps, into two walls which enclose an open gallery between them, as at Tyryns and elsewhere, making in all a structure some ten feet thick. They have occasional loop-holes, and large towers at the gates. The openings are fitted with jambs carrying double lintels, over which are relieving arches both round and pointed, yet not laid in voussoirs, but simply cut out from the horizontal courses, in the primitive Greek fashion. In some places, as Mr. Clarke notes, an older Pelasgian or Cyclopean wall is built over with the later coursed work.

But the most interesting architecture, next to the temple, described in this report, is that of the Street of Tombs, or rather necropolis, since it consists of more than a single street. It lies outside the walls, according to the Greek and Roman habit, on the western slope of the hill, and before the chief entrance of the city. Here is the only level part of the main road which leads up to the acropolis. Beside and above it, laid out in terraces which rise till they reach the bordering wall on the height, is the cemetery. Here were found a great number of tombs and sarcophagi. Most of them had been attacked and rifled with an energetic zeal which had broken the heavy stone covers of the sarcophagi, or dashed in their sides, where they were hollow, or spent itself in bruises where they were solid; but a few still contained vases and other small objects of funeral service, and even human bones. Mr. Bacon's sketch of a restored section of these terraces is an enticing picture. Arranged along the edges of the terraces are tombs in great variety of form, smaller sarcophagi of a single block, larger ones built up, and some richly carved, vaulted receiving-tombs with niches and benches, one of which is shown in detail in the report. The large carved sarcophagus of which the report gives a view in its present condition (p. 127) and a restoration (Plate 34) is one of the most gracefully-designed tombs that have yet been discovered. Since the publication of the report the ground about it has been dug away, and it now appears that the sarcophagus with its surrounding stone bench was raised on a broad platform above the terrace, with a high cippus or pedestal in the form of an altar projecting from the face of it. The whole group, according to the drawings of it sent home, made an architectural composition of extreme dignity and elegance. The cemetery was laid out with an eye to its picturesque fitness for a public promenade, and two exedras, one semicircular in plan, and the other making three sides of a rectangle, were found at the heads of two flights of steps leading up to one of the terraces.

Another interesting monument — and of especial importance, because no other like it is known to exist — is the ruined bridge over the Satnioeis a mile or so north of the principal gate. The aversion of the classical Greeks to the arch — or their preference for the lintel — seems to have extended even to their bridges, which being mostly built of wood have naturally perished. But here are the remains of a stone bridge which Mr. Clarke unhesitatingly, and no doubt rightly, assigns to the classical period. The Satnioeis, like most rivers in dry countries, is a very much broader stream in winter than in summer, and across the winter bed of the river, which appears to have been carefully paved, the bridge was carried on seventeen stone piers, while the summer bed, where it makes a span of about forty-five feet, is flanked on one side by a heavier pier and on the other by a solid abutment. The piers are rhombic in plan, about twelve feet long and a yard wide, their longer diagonal being of course with the current. They are admirably constructed in courses joggled on each other horizontally, so that neither current nor ice-flow could slide one course upon another. The bridge, following the road, was somewhat skewed, and the piers, with their longer axes parallel to the current, were set *en echelon*, the roadway therefore crossing them obliquely. The piers were about their own length apart from centre to centre; the roadway, ten feet broad, was a platform of four stone beams two feet and a half wide and fourteen inches deep, with an average bearing of nearly twelve feet. Holes are visible for the swallow-tailed wooden dowels which held them together in the customary manner of Greek stone-cutting, and show that each beam was dowelled to those beside it, the outside ones to those they abutted against end to end, and all to the piers on which they rested. One can only guess that the wide span over the permanent stream was crossed by a timber bridge. Somewhat lower down the river are the arches of a Roman bridge, from which the stream has wandered away till it is out of sight.

We must speak briefly of the merits of the report as a document. The Archæological Institute is fortunate in having the aid of Mr. Clarke's energy and trained intelligence, and of Mr. Bacon's artistic capability. We have never seen better work in its kind than the drawings which illustrate the report. They have a convincing air of truthfulness, as well as a very attractive simplicity of treatment and artistic handling. Mr. Clarke's account of the work is vigorous and graphic. The whole story of the explorations has the mark of intelligent management, conscientious work, and acute and precise observation. The result has been obtained at a very small cost, less than nine thousand dollars thus far for the whole expedition, which, compared with the outlay, for instance, of eighty thousand dollars by the British Museum for the excavations at Ephesus, seems singularly little. We are told that the second summer's work has exhausted the purse of the Institute; while there is still some work of importance to be done, especially the thorough examination of the walls and fortifications of Assos, for which this is probably the only opportunity; for the Turks, needlessly exasperated perhaps, but not unnaturally, at the way in which their territory elsewhere is being despoiled of relics which they themselves have not learned to value, declare that they will grant no more permits for excavation to any one. Mr. Clarke estimates that the rest of the work can be done for another twenty-five hundred dollars. It is to be earnestly hoped that the friends of research will help the Institute, which has given all the money it could to the work, to raise what is necessary to fitly complete it.[2]

The getting-up of this report is excellent. The drawings are more than fairly-well reproduced, though the plates of sculptures might do more justice to the originals if the reproductions had been somewhat smaller in scale. The simple, convenient and rather elegant form in which this paper is printed leads one to hope that when the "monumental volume" is issued, which Mr. Clarke promises as the final outcome of the expedition, the same taste and judgment will strike the right mean between the useful and the magnificent. The monumental volumes which gratify the *amour propre* of their producers and catch the applause of dilittanti, bestowing indiscriminate splendor of execution alike on bare plans or delicate ornament, are apt to be the despair of the serious student and the professional man, — being too big to handle and too costly to buy.

We heartily commend the report to those of our readers who find it within reach. To persons who do not otherwise follow the progress of archæological research, it may give a good understanding of how such work is done, and of its character, — perhaps a new interest in the subject, if not quite the enthusiasm of a discoverer.

It is natural, indeed, that the explorer's parental instinct should invest his foundlings with special charms, and perhaps ordinary readers will hardly keep pace with Mr. Clarke's exegesis of the

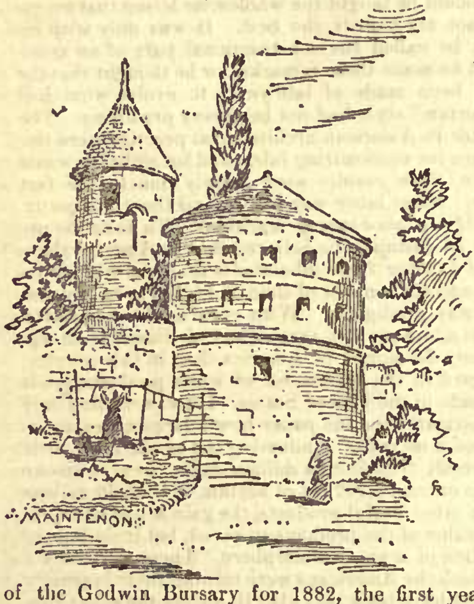
[1] Papers of the Archæological Institute of America. Classical Series. — I. Report on the Investigations at Assos, 1881. By Joseph Thacher Clarke. With an Appendix containing Inscriptions from Assos and Lesbos, and papers by W. C. Lawton and J. S. Diller. Printed at the cost of the Harvard Art Club and the Harvard Philological Society. Boston: A. Williams & Co. London: N. Trübner & Co., 1882.

[2] It is pleasant to see it publicly announced, since the above was written, that the necessary money has been raised, and that the exploration will go on.

sculpture figured in Plate 17, a lion attacking a boar. "The legs and tail of the boar," says Mr. Clarke, "are characterized with great truth. Though seized by the lion, the animal has not lifted his head from rooting, the attack in the rear not seeming to cause him much disturbance. The hind legs are set to withstand the burrowing push of the snout; the tail hangs limply on the broak flank as if in indication of boggish enjoyment." "The sculptor," he adds, "has displayed a certain sense of humor which makes up for the ungraceful carving,"— and some sense of humor is a prophylactic which is not without its value, either in art or criticism.

The reader will bear with the writer's repugnance to the usual English terminology of his profession, and almost hydrophobic shunning of terms of Latin origin,— with the use of *pteroma* for peristyle, of *crepidoma* for stereobate, *epistyle* for architrave, — and can forgive the shock of reading *trunnels* for guttæ. But if he is sensitive in the subject of good manners he will be more seriously disturbed at Mr. Clarke's treatment of Texier. We have no doubt Mr. Clarke is right in charging that Texier's examination was superficial, his conclusions hasty, and his report full of errors; that like most restorers, and perhaps with less caution than most, he filled up the gaps in his information with guesses. It is perhaps not going beyond bounds to say, as this report quotes, that he had "*le génie de l'inexactitude.*" The greatest paradox in Texier's restoration, the sculptured architrave, Mr. Clark has confirmed, against his own expectation. But he accuses him in so many words, of "unparalleled effrontery" for putting in, "scaled to the millimetre," a bed-mould under the corona. This bed-mould, we believe, is nowhere found in Greek Doric, and for this reason it is not necessary to assume nor easy to believe that Texier put it into his restoration without having seen something which persuaded him that it did exist. Again says Mr. Clarke, Texier's assertion "that the thickness of the reliefs was uniformly equal to one-half the lower diameter of the peripteral shafts must be regarded as deliberately false." He could hardly have offered a grosser affront. Yet if the reader will take the trouble to measure Mr. Clarke's restored section of the entablature he will see that the upper bed of the sculptured block—not the soffit, which is rebated to receive the middle lintel — has nearly (Texier does not say "uniformly," and the lower diameters are by Mr. Clarke's account irregular) the width of the lower diameter, sufficiently so to justify the general remark which provokes Mr. Clarke, and the argument drawn from it, that the blocks really were part of the architrave. It is our impression that M. Texier has already gone where this attack in the rear will not cause him much disturbance; but it is a pity that any one whose intelligence and acquirement has a real claim on our respect should pursue him with the language of contemporary politics. It is a pity to import into the first prominent publication of the Institute, which is in most respects a model report, the personal rancor that gives unsavory notoriety to German savants.

AMERICAN ARCHITECTURE IN ITS CONSTRUCTIVE AND SANITARY ASPECTS.[1]



AT the ordinary meeting of the Royal Institute of British Architects, held on Monday evening, December 18, Mr. Ewan Christian, Vice-President, in the chair, Mr. A. J. Gale, the holder of the Godwin Bursary for 1882, (the first year of its award) described what he had seen during his tour in the United States. He observed that at the invitation of the Council he ventured to bring before the Institute some account of his tour as holder of the Godwin Bursary for 1882, the first year of its existence, although he was obliged to admit his inability to do justice to the subject on account of its extent and varied nature. The tour covered a great deal of ground, and that he had been enabled to see so much as he had seen was due to the great kindness of many American architects. The tour occupied exactly three months, of which ten weeks were spent in America — five weeks in New York, and the remainder of the time at Philadelphia, Baltimore, Washington, Chicago, Detroit and other cities. In New York at the time of his visit there were many vast building schemes in hand. Prominent among the matters to which he turned his attention was the work being done by the New York City Board of Health with the view of improving the tenement-houses with regard to drainage and other sanitary arrangements. He had, however, dealt somewhat fully with these matters in the report which he had previously presented to the Council. Vast buildings let off as offices formed one of the sights of New York. Such blocks were continually being erected, and the most recent one generally managed to outshine its predecessors in some particular or other. Foremost amongst the works of this kind at the time of his visit was that known as the Mills Building (from the name of its owner, Mr. D. O. Mills), having frontages to Wall Street, Broad Street, and Exchange Place. This building, of which Mr. George B. Post is architect, was nine stories high above the ground level, with a cellar or basement story below. The basement, ground, first and second floors contained strong-rooms for the deposit of books, securities and other valuables. All the floors were intended for suites of offices, divisible by means of partitions into holdings of any required size. The lighting throughout he considered good and sufficient, though, judging from the plans, some of the rooms only had "borrowed light." The large entrance-hall was two stories in height, and it contained elevators or lifts constantly conveying passengers up and down, although the building was only partially completed and opened at the time of his visit. The entrance-hall, which contained a well-hole for lighting the basement, had a glass roof. The offices derived their light partly from the street frontages and partly from the lighting space or area over the roof of the entrance-hall. The height of the cellar or basement story was 9 feet, that of the ground floor 13 feet 8 inches, that of the first floor 17 feet 8 inches; the height of the stories gradually diminishing from the second to the ninth story, which was 10 feet in height. The walls were of brick, with red-brick facings and stone and terra-cotta dressings. The general design consisted of a simple combination of vertical and horizontal lines, very effective and suitable for the purpose, the treatment of the detail generally being classic. The roof was flat, constructed of rolled-iron joists filled in with terra-cotta bricks in the form of voussoirs, and covered with cement. Roofs of this construction had been used upon almost all recent buildings of large size. The main stairs were entirely of cast-iron, with the exception of the treads, which were of slate; iron-work taking the place of wood in the construction of newels, strings, risers, balusters, etc. The internal partitions between the offices were built of hollow terra-cotta bricks, corrugated externally to receive the plastering. To preserve the handsome hard-wood dados from decay through damp from the washing of the floors, marble plinths were provided. He understood that the drawings for this building were prepared, and the building completed ready for occupation, within twelve months from the time that the architects received their instructions, — an illustration of the great rapidity of performance which was characteristic of American building operations. The heating of the building was effected by steam, on the direct radiation system, and the coils of steam-pipes standing in the rooms formed by no means inelegant features. The system of steam-heating by direct radiation seemed to find more favor amongst American architects than steam-heating by indirect radiation, or heating by hot water or hot air. With regard to the apartment-houses of New York, Mr. Gale said he had entered somewhat fully into details in the report which he had presented to the Council. Many of these blocks of buildings in flats were eight or nine stories high, and those for the middle classes were constructed in the most elaborate manner and provided with all the conveniences that modern construction could command. The construction of the tenement-houses or flats for the lower classes was under the supervision of the New York City Board of Health, who were empowered, under an act passed in 1867, and amended in 1879 and 1880, to regulate the construction and sanitary arrangements of these dwellings, and the results which had been obtained under this administration were very satisfactory. Plans of all proposed tenement-houses had to be submitted for the approval of the Board, and careful attention to the observance of the Board's requirements with regard to construction and materials was enforced by a staff of inspectors. The higher class of houses in flats, known as apartment-houses, were subject to corresponding restrictions. These buildings were provided with handsome entrance-halls, and elevators continually running up and down. The best arrangement of plan for these buildings was obtained by grouping round a compact central hall, not too large — in fact hardly more than a large lobby — four or five dwellings or suites of apartments. The servants' rooms were kept quite apart. An entrance-court, formed in the basement and easily entered by tradesmen's carts, gave access to the servants' elevators. This court, which was well lighted and ventilated, was for the most part covered with a substantial roof, the top of which formed the court-yard or carriage-entrance for the residents. The floors were mostly of fire-proof construction, consisting of iron joists filled in between with hollow arching-blocks, the iron-work being protected above and below, and joists being laid on the top surface of these fire-proof divisions. Most of these buildings were constructed externally of brick, with stone dressings. The roofs were flat and of fire-proof construction, and the heating was effected by steam on the direct-radiation system. Fireplaces were, however, provided as well. The wood-finishings were generally good. Some of these blocks of apartment-houses were built by associations of intending occupiers, who were thus able to provide themselves with exactly what they wanted, and at the same time were able to choose their neighbors. The plumbing and house-drainage

[1] From the *Builder*.

arrangements of New York were also under the control of the City Board of Health. Under their Plumbing Law, dating from 1881, all plumbers had to register their names and addresses, and had to submit sketches and details of all works proposed to be executed by them. The chief point in which the regulations differed from the most advanced English views at the present time was in regard to the material to be used for soil-pipes, which in New York were required to be of iron, which must be properly jointed and coated inside and out with coal-tar pitch applied hot, except where enamelled surfaces existed. The other rules insisted upon by the Board did not differ much from those observed in the best English practice, but there was a thoroughness about the inspection, and an amount of attendance to minor details, which were far in advance of the supervision of an average English local Board. Every precaution in the way of ventilation and the prevention of siphonage was rigidly insisted upon. The Durham House-Drainage Company, of Chicago, contend that as it is worth while to convey coal-gas in wrought-iron mains with screw-joints, in order to prevent leakage, so it is worth while to prevent the escape of sewer-gas by the same means. This company uses wrought-iron pipes with screw-joints for soil-pipes, which are strong enough of themselves to carry the entire weight of the closet-apparatus, without any support from the building. By this means, it is urged, all danger of leakages owing to settlements is completely avoided. For the horizontal or drain pipes this company uses cast-iron, socket-jointed pipes, the joints being made with lead. These iron drain-pipes could be, and often were, suspended from the under-side of the ground-floor of a building, and were provided with movable caps, to allow of inspection or cleansing if necessary. This system of house sanitation had been adopted in a town built by Mr. Pullman, of sleeping-car fame, for his work-people. In Chicago and Boston, as well as in New York, great attention had been paid of late years to the ventilation of public buildings. The Fifth-Avenue Presbyterian Church, New York, better known as Dr. John Hall's Church, was one of the most successfully ventilated buildings in the world. It was erected from designs by Mr. Carl Pfeiffer, and was pronounced by Captain Douglas Galton to be the best ventilated church he had seen.[1] The Madison-Square Theatre (of which Messrs. Kimball & Wisedell were the architects) was also very effectually ventilated on the same principles. The most important work now in progress in Philadelphia was the immense block of public buildings to contain the various municipal offices. The buildings occupy a nearly square site, the two frontages from north to south measuring 486 feet 6 inches, and the two frontages from east to west measuring 470 feet, the area of the site being 4½ acres in extent. The offices are grouped round a huge quadrangle. The large tower in the north front was 90 feet square at the base, and it was proposed to carry it up to a total height of 535 feet, it being surmounted by a statue of William Penn, 36 feet in height. The following were some of the other dimensions: height above pavement-line to centre of clock-face in tower, 361 feet; diameter of clock-face, 20 feet; height of upper balcony, 296 feet; total number of rooms, 520; total amount of floor area, 14½ acres; height of each centre pavilion, 210 feet 10½ inches; height of corner towers, 161 feet; height of basement story, 18 feet 3½ inches; height of principal story, 33 feet 6 inches; height of second story, 25 feet 7 inches; height of third story, centre pavilions, 26 feet 6 inches; ditto, wings, 24 feet 3 inches; ditto curtains, 20 feet 5 inches; height of attic of centre pavilion, 15 feet; height of attic of corner towers, 13 feet 6 inches; height of figures on centre dormers, 17 feet 6 inches; height of figures on corner dormers, 12 feet 10 inches. The substructure was of fine white granite, the superstructure being of white marble. The tower was to be built of squared, dimension stones, weighing from two to five tons each. It had not been attempted to make the building fire-proof in the sense of protecting all the constructional ironwork. The building was being erected from the designs of Mr. John McArthur, architect, under whose superintendence the sculpture and carved work in general were executed after models prepared on the spot. Mr. McArthur's designs were selected in competition in September, 1869, and the building was commenced early in the following year. The total amount spent upon the building up to 1879 was $5,000,000, and the estimated total outlay was $10,000,000.[2] The new Post-Office at Philadelphia was next described in some detail by Mr. Gale. It is being erected under the superintendence of Mr. James G. Hill, Supervising Architect to the Government. The drawings for this and similar buildings were made in Washington, where architectural matters formed a branch of the Treasury Department. Mr. Hill's last annual report showed many court-houses, post-offices, custom-houses, and the like, in course of erection, each under the care of a competent official architect. The essayist then proceeded to say a few words as to the Johns Hopkins Hospital, Baltimore, which he said was one of the most interesting buildings of its kind in the world. This building was the result of a study and examination of all the chief hospitals in Europe, by Dr. Billings, of the United States National Board of Health, who was selected for that purpose under the will of the founder, the late Mr. Johns Hopkins. The architects were Messrs. Cabot & Chandler, of Boston, and Mr. Niernsée, of Baltimore, the last-named gentleman being the consulting architect. Mr. Gale, in conclusion, noticed the methods of constructing iron-fronted buildings, and described the precautions which were being taken in Chicago, Boston, and other large cities against the recurrence of such disastrous fires as those cities had experienced of late years. Several methods of fire-proof construction were described, including the one which is being applied by a company under the management of Mr. Wight, formerly an architect.

The Chairman, in inviting discussion, said he thought Mr. Gale had shown that he was a very proper holder of the Godwin Bursary, and he had given them a large mass of information which it was not easy to digest all at once. When Mr. Gale was describing the immense public buildings of Philadelphia, and the enormous scale upon which everything was being carried out in them, he (the Chairman) felt very much like one of the inhabitants of Lilliput. He was reminded of what Professor Cockerell was very fond of dwelling upon, — the description of the stones which were used in the building of Solomon's Temple,—"great stones," "large stones," "costly stones." The new public buildings in Philadelphia resembled Solomon's Temple in another particular, viz., in the fact that every stone and every part was prepared ready for fixing before coming on the site. There was a great deal to be learned from the doings of American architects, as detailed by Mr. Gale, and from personal observation during a visit to America he (the Chairman) could fully confirm a great deal that had been said by the essayist.

Mr. John Slater said it seemed to him that America was the country, *par excellence*, where suggestions were to be picked up by architects. To put the matter colloquially, it was the great place for "tips," and there could be no better place for an architect to visit than the States, after studying on the Continent of Europe the artistic and archæological sides of his profession. The Americans were, in fact, so ingenious that their ingenuity was catching, and it appeared to be impossible for any one to visit the States without deriving much instruction. As a proof of this assertion, he mentioned that some time ago he was superintending some work where the builder's foreman was a man who had visited Chicago, and spent some time there in working at his trade,—that of a carpenter and joiner. A very excellent foreman he was. Like Ulysses, he was rich in resource, and altogether he was a very different sort of man to the average builder's foreman. It appeared to him (the speaker) that builders and builders' foremen were the most conservative men that it was possible to come across. They seemed, almost without exception, to think that what was good enough for their fathers was good enough for them. As a rule, they had very little idea of scientific principles of building construction. The consequence of this state of things was that if an architect wanted to do anything out of the ordinary way it was very difficult to get it done properly. It resulted from this, again, that architects were, in a measure, in danger of confining their work too much in one groove. For these reasons he looked with great delight upon the institution of the Bursary which Mr. Godwin had been good enough to endow, for by its means they would be enabled to get a practical knowledge of a great many of the constructive and other details of the architecture of other nations, and should be taught the wholesome lesson that everything English was not necessarily the best. It was only with regard to what might be called the constructional part of an architect's profession that he made these remarks, for he thought that the attempts which had been made of late years to evolve what had been called a "Victorian" style had not been very promising. The chief points observable in American architectural practice were the means that were taken for economizing labor and for utilizing waste products. Of course, those results were largely due to the fact that in a new country, where labor was scarce and therefore costly, it was necessary to devise labor-saving machines. To take the use of the telephone as an instance, he believed that in America there was hardly a town of 6,000 or 7,000 inhabitants that was without its telephone-exchange, and the amount of time and labor saved by that one appliance alone was prodigious. With regard also to electric-lighting, the practical adaptation of that means of illumination was very much more largely developed in America than in this country. Then again with regard to the utilization of waste products, great strides were being made in the United States. He was reading only last week in an American scientific paper how a large manufacturing firm had hit upon a means of condensing the smoke from their furnaces, with the result that from a million cubic feet of smoke they had been able to extract 4,000 lbs. of acetate of lead, 70 gallons of alcohol, and some other useful products, the gain achieved representing not only the value of the products so saved, but including, of course, the preservation of a purer atmosphere. These were only a few of the ways in which the Americans were turning their ingenuity to account. He should have been very glad if, among the other subjects which Mr. Gale had been able to study, some mention had been made of the educational buildings of the States, to which great attention had been paid. A few months ago he (Mr. Slater) received from the Educational Bureau at Washington a treatise on rural school architecture, showing the best means of planning, building, ventilating and warming such schools, on which, as a rule, only a very limited outlay was possible. In the treatise the scientific laws of ventilation were precisely laid down and illustrated, and altogether the little book was one of the most useful of its kind that could be conceived. If in this country our own Education Department would issue such manuals great good would be done, if only in preventing School Boards from laying down such absurd conditions as were sometimes imposed by them upon architects

[1] See *Builder*, vol. xxxiv (1876), pp. 193, 195, for view and plans of this church, together with description of warming and ventilating arrangements.

[2] A double-page view of this building and some additional particulars will be found in the *Builder*, volume for 1876, pp. 712, 715.

4

whom they invited to send in competitive designs for schools. The treatise to which he referred was issued in 1880, and it was stated in the preface that it was hoped to issue further publications dealing with the construction of high-schools, academies, and colleges,—in short, with buildings for what we called secondary education. He begged to move a vote of thanks to Mr. Gale for his paper, and he thought that the Institute might be congratulated upon the first results of the Godwin Bursary.

Mr. H. McLachlan said that as an unsuccessful competitor for the Bursary last year, he had much pleasure in seconding the vote of thanks to Mr. Gale, who had evidently made good use of his time and opportunities. It appeared that in America there was great variety of materials; for, besides stone, brick and wood, iron was also used for the fronts of buildings. It would be interesting to know a little more as to the manner in which buildings of iron and wood were protected against injury resulting from the extreme climatic changes experienced in North America. How was it possible to warm the buildings which were constructed on what had been spoken of as the "iron shell" method? If he understood that mode of construction, the front of the buildings consisted for a large part of its surface of a mere skin of iron, which would afford little or no protection against extreme external cold or heat. It was well known that the old abbeys of Britain, where the walls were very thick, were warmer in winter and cooler in summer than buildings whose walls were of the thickness now commonly used. With regard to the methods of fire-proof construction which had been described, it appeared to him that there was danger in covering up the structural iron-work in the manner described, inasmuch as iron was, as everybody knew, liable to decay by rust, and it was, therefore, advisable to be able to get to the iron-work to inspect it occasionally, so as to judge of its condition. But by the means of covering up which had been described such inspection would be impossible. Mr. Gale was to be congratulated on having got together so many drawings explanatory of what was being done in America.

Mr. W. Woodward expressed the hope that, as the paper was one of great interest and practical value, the council would publish an adequate number of the illustrations to accompany it in the "Transactions."

Mr. Andrew T. Taylor said that as he had just returned from a visit to the United States and Canada he should have much pleasure in supporting the vote of thanks. He could heartily endorse what had been stated by Mr. Gale as to the activity and energy which prevailed in America with regard to architectural and building matters. Great progress was being made by the architects on the other side of the Atlantic. A few years ago it was the habit of all architects in this country to say that no good thing architectural could come out of America, and the works of American architects were, as a rule, looked upon with contempt. But that feeling was fast dying out, for within the last three or four years the strides that had been made by American architects on the artistic side of their work were something wonderful, especially in regard to private residences. Within the period named there had been built in Boston, New York, and elsewhere, houses which, from an artistic point of view, it would be difficult to surpass, even in London. The Americans spent large sums of money on the interior finishings of their houses. They frequently spent 60,000*l.* or 70,000*l.* on the interior of one house. The fittings and joinery were generally of hard and costly woods, and the buffet was very often a part of the construction of the house. Two of the most noticeable and costly houses which had lately been erected were those of Whittier, a broker, and Mr. Vanderbilt. A visit to the mansion of Mr. Vanderbilt, he was bound to say was somewhat dazzling, so costly and rich were all the finishings and "appointments." Indeed, it was said in New York that several tradesmen had made their fortunes simply out of the furnishing of this mansion, which, by the bye, had for its principal entrance fac-similes of Ghiberti's celebrated gates of the Baptistery at Florence. As to the cast-iron construction of house-fronts, he (the speaker) had been much disappointed with it. He was in hopes that the Americans would have succeeded in evolving a style which would have been suited to the characteristics of the material, but all their attempts seemed to follow more or less closely the lines of stone-work, and being shams, they were, of course, failures. One of the most striking features to be observed in connection with the lofty buildings of New York and other American cities was the very general use of "elevators," or lifts, as we termed them. One or more of these elevators was to be found in every building, and being always in motion there was no waiting by passengers who wished to ascend or descend. The more general adoption of elevators or lifts in London buildings could not but be attended, in his (the speaker's) opinion, by great advantages, foremost amongst which would be the realization of rents for the upper floors of lofty buildings almost equal to the rents now obtained for ground or first floor suites of rooms. With regard to the Philadelphia public buildings, the lofty tower described by Mr. Gale was not yet built, and it was doubtful whether it ever would be built. The buildings themselves were very French in general massing and grouping, and their architect had evidently made particular study of the Tuileries, Louvre, and the new Hôtel Dieu. The detail, however, was indifferent, though not so very bad for America. The detail of the new Post-Office at Philadelphia, and of some other Government buildings in the States, was very poor, showing great poverty of invention. The explanation of this would appear to lie in the fact that all these large buildings were designed at head-quarters in Washington. He agreed with Mr. Gale that many of the large apartment-houses of New York exhibited great ingenuity of planning, and he was able to corroborate all that had been said as to the use of the telephone and other labor-saving appliances.

Mr. Gordon Smith, architect to the Local Government Board, said, with reference to the way in which things were managed in New York and other cities with regard to plumbing and drainage, that he thought it just possible that if all regulations for such works in London were administered by one central authority, such as the Board of Works, we might be able to do better than we now did. But he should like to know from Mr. Gale whether the Boards of Health of New York and other cities were harassed by the operations, just beyond the confines of the areas under their administration, of such a being as our own "jerry" builder?

The chairman, in putting the motion, said that, having had the advantage of travelling in America, though only for a short time, he was very much impressed by the "go-aheadedness" of the Americans. If a man in the States brought out a good invention connected with building or anything else, it was straightway adopted all over the country until something better was produced, when that, in its turn, was taken up. The Americans did not wait, as we in England did, for things to be perfected before they used them. The telephone, for instance, had been in common use in Detroit for two or three years, and householders who needed the services of butcher, baker, or doctor could, by making their desire known to the officials at the telephone-exchange, be "switched on" to the wires connected with shop or surgery, and so could give their orders or ask for advice without leaving their houses. Take, again, the electric light, which had been in general use in Detroit, for years, although the English were still waiting for it to arrive at perfection before adopting it. With regard to the subject of ventilation, as carried out at Dr. Hall's church, he (the chairman) could fully confirm what had been said by Mr. Gale. The only quarrel he had with the church was that it was too luxurious, for every person was provided with an easy chair. Not only in regard to ventilation, but in the matter of acoustics, Dr. Hall's church appeared to be perfect. It was built for a congregation of 2,000, but in a building of the same size we in England would pack at least 3,000 people into it. As to iron for the fronts of buildings, he was sorry to hear that his nephew (who was his pupil twenty-eight years ago) had become such a heretic as to adopt iron fronts. He had not done so when he (the chairman) visited Detroit. Long ago, in New York, the enormous store belonging to A. T. Stewart & Co., was entirely built of iron, and it was the most horrible and bald-looking building that could be conceived. With regard to comfort in dwelling-houses, in the coldest weather the indoor temperature was equably maintained at from 65° to 70°. The walls of the houses were so constructed that the occupants did not suffer from changes of temperature, as we did in this part of the world.

The vote of thanks having been agreed to unanimously, Mr. Gale, in reply, said he was unable to say whether there were jerry builders round about New York. If there were, he did not seek out their works as objects of study. As to iron buildings, it should be remembered that there were two methods of using it, one of which was seen in Stewart's store, where the entire front was of iron treated in imitation of stone, having columns of Classical character and elliptical arches,—the whole design being as unsuitable as it could be for iron; but in New York and other cities a better method of treating an iron-fronted building had sprung up, and he might plead for Mr. Gordon Lloyd to Mr. Christian and others that Mr. Lloyd's iron-fronted buildings were not attempts to reproduce architectural features in an unsuitable material, but they consisted in a combination of vertical and horizontal lines, with ornament which was suitable to cast-iron. With regard to the heating of buildings, it was effected in various ways, as by direct and indirect radiation from steam-pipes, by hot air, and by hot water. As to the heating of the iron-shell buildings to which Mr. McLachlan had referred, there was no difficulty whatever, for between the external skin of iron and the internal walls air-spaces existed, forming, in reality, a kind of hollow wall. Buildings, of course, suffered from great extremes of temperature, but so far as he could judge, the joints were so well lapped and checked in various places that they effectually resisted changes of temperature. With regard to the fire-proof encasement of iron columns and girders, the enclosing materials hermetically sealed up the iron-work, it being believed that where the air could enter fire could also make its way. Hence the iron-work in buildings so fire-proofed was not likely to suffer from rust. He was not concerned to defend the detail of the Post-Office at Philadelphia, but it ought in fairness to be said that other Government buildings erected under the superintendence of Mr. J. G. Hill displayed an amount of artistic taste considerably in advance of some of the buildings put forward as specimens of Government architecture. In conclusion, Mr. Gale said he agreed with a former speaker in commending the ingenuity of plan shown in the New York apartment-houses, which were well worthy of study in this country.

THE ILLUSTRATIONS.

SKETCHES AT ASSOS. BY MR. F. H. BACON, ARCHITECT.

COTTAGES AT NEWTON CENTRE, MASS., FOR H. P. CLARK, ESQ. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

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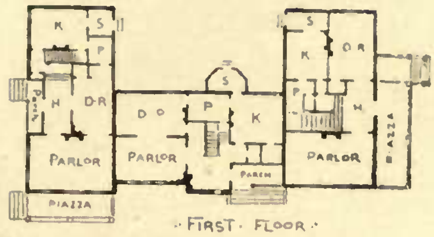

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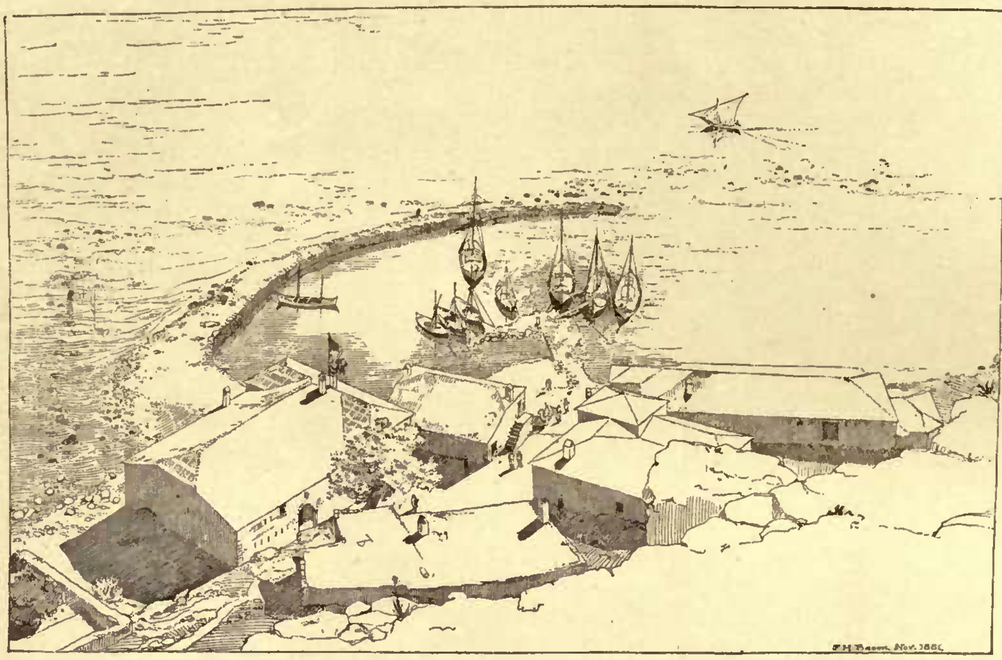

Plate 36. Port and Turkish Mole.

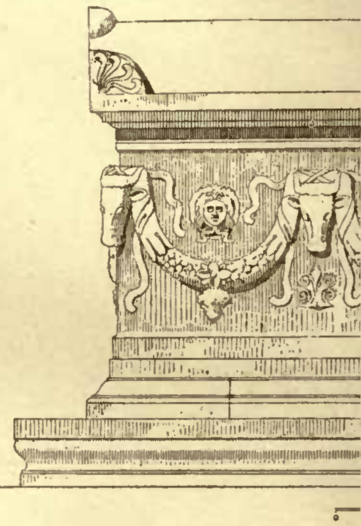

Plate 34.

Sketches

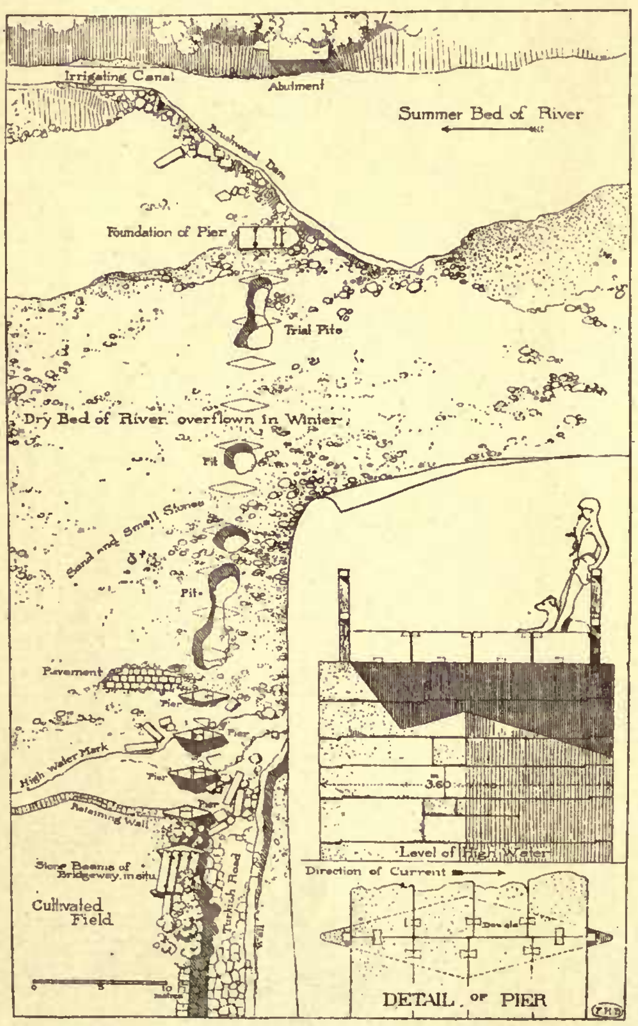

Plate 35. Bridge on the Satnioeis.

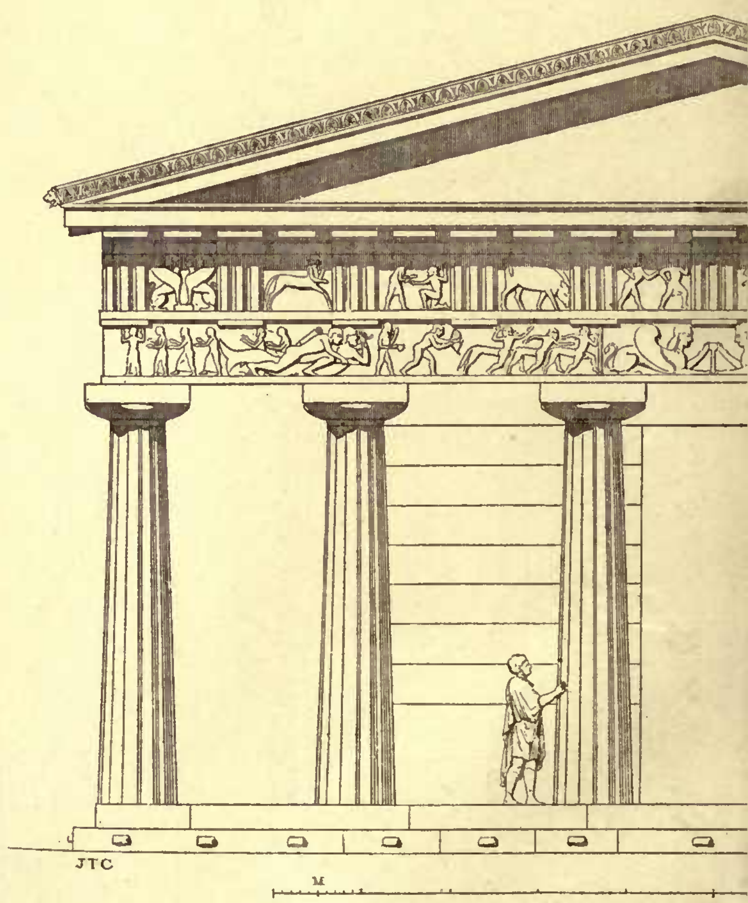

Plate 14. Front of

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[...]PHAGUS, RESTORED.

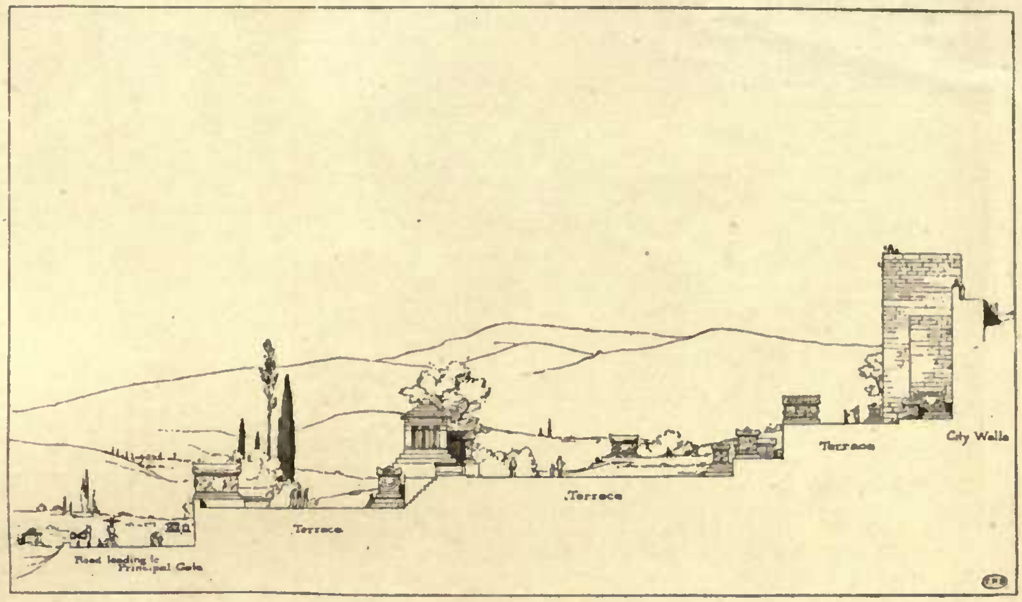
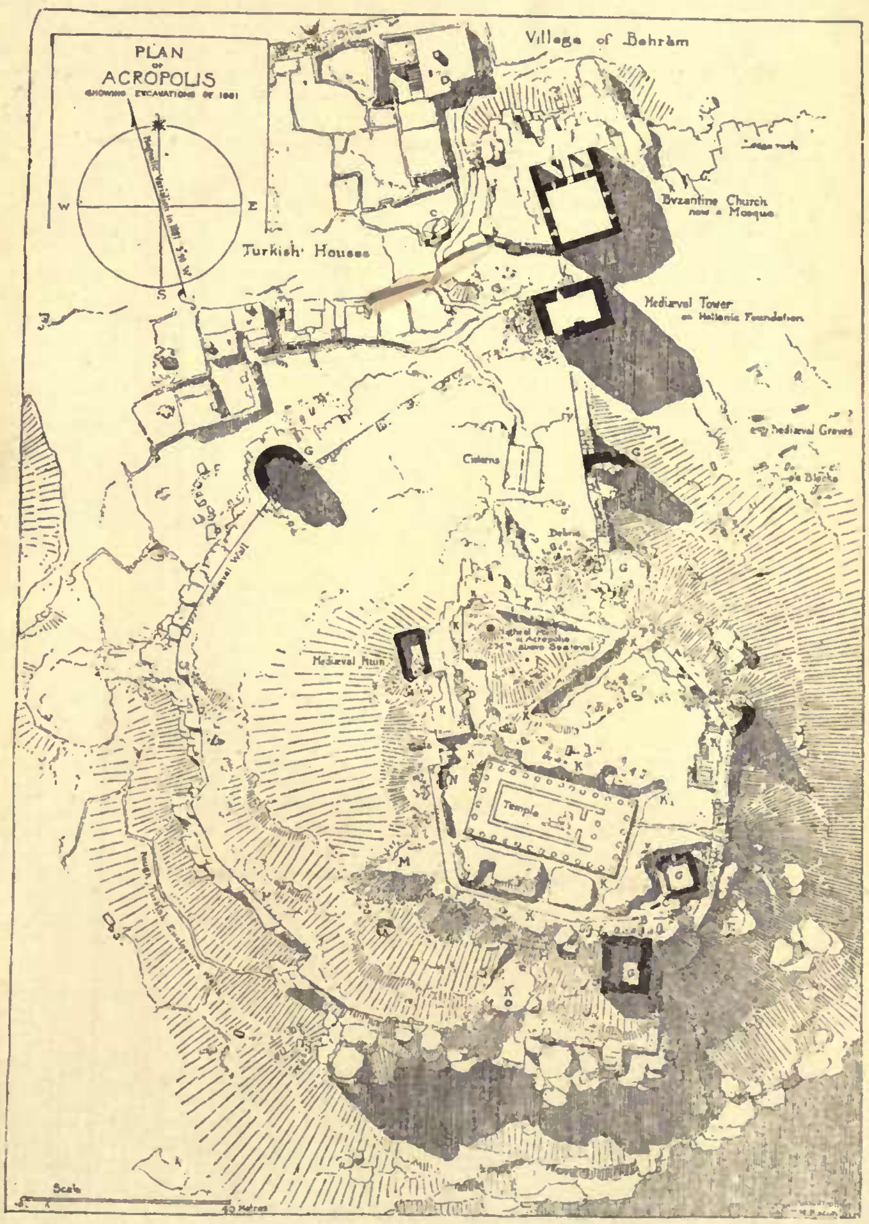


PLATE 29. SECTION OF CEMETERY, RESTORED.

[...] at Assos.

[...] RESTORED.



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BUILDING IN CINCINNATI IN 1882.

THE year of 1882 ends from an architectural stand-point about the same as several of its predecessors; that is, in a quiet, orderly and respectable manner, without any particular reason for a disturbance of mind or body on account of great good accomplished or of any unusual backsets. When we survey the year's record, however, it is with feelings of congratulation that while business has not been extraordinarily good yet it has not been extraordinarily bad: it might have been better, it might have been worse.

We have no means of knowing from any correct records kept by the city authorities the number and cost of buildings erected here, but the records kept form a basis of comparison, and so turning to them we find the following comparative statement for the past four years:

Year.	No. of Permits.	Cost.
1882	660	$1,952,300
1881	569	1,832,600
1880	636	1,521,700
1879	773	1,730,000

However, we are not left in the dark entirely as to the amount expended here in building, for we know that there were consumed about sixty-one million of brick last year, and that the cost per thousand laid in the wall would average $10, which would make the total cost of brickwork $610,000; and we know that the brickwork will average one-fourth the total cost of a building, so that this will give us in round numbers $2,500,000 expended in buildings during the year just ended, and this amount will not fall far short of the correct amount.

The past year will be remembered beyond all others, perhaps, for the number and large size of factories and warehouses erected. Probably more of this class of buildings were started or finished than in any previous year.

The new Art Museum, of which Mr. McLaughlin is the architect, is the only building of any great magnitude begun during the year. The foundations of this building have been contracted for and are being rapidly laid. The contracts for the superstructure will be awarded in the early spring.

The Government building still pursues the "even tenor of its way" toward a future completion. It has required about eight years in being born and reared to youth, and the supposition is that it will take eight years more before it will be full-grown and be of any particular use. At present the stone-work is finished, the roof is about half on, and the brick arches between the I-beams for the floors have been turned, but nothing in the way of inside finish has yet been attempted unless, perhaps, some iron door-frames that are put in place might be construed as inside finish.

Generally, the houses erected during the past year have been well designed and built, partaking principally of the Queen Anne style, of a modified form withal, as the extreme craze has not yet reached us. Pressed brick are being more generally used than ever before, and there is a marked improvement in the design and construction of houses of recent date over those of say, ten years ago, even by the same architect. Let us hope that the improvement thus made is as nothing compared to that which is to follow.

There can be no doubt but that the *American Architect* has done more than any other one cause to create, nurture and spread abroad this correct architectural feeling and taste, and this paper, together with the American Institute of Architects, is responsible for the better-designed and better-constructed buildings that we see around us so plentifully now, where they were so scarce a few years ago. At least this is the feeling in and about Cincinnati. C.

WORLD'S FAIR AT CALCUTTA.— Arrangements for holding an international exhibition at Calcutta in 1883 have been concluded.

A NEW FORM OF INSURANCE.—According to a Continental journal, an insurance company has been established in Paris under the title of "Le Bâtiment." This body undertakes in consideration of annual premiums the maintenance in good constructive and decorative condition of all kinds of buildings. It is stated that the principle of the association is to assure to householders a provision against being prevented by temporary want of funds from having to exercise economy which may afterwards lead to increased expense. The project is not very clear.

FORT ANCIENT.

THE fourth of the course of lectures complimentary to the subscribers to the exploration-fund of the Peabody Museum, given by Professor Putnam at the Museum in Cambridge, is reported in the Boston *Transcript*. The lecture was a consideration of some of the earthworks in Ohio, Tennessee and Illinois, and particularly of the largest, which is known as Fort Ancient. Professor Putnam said: —

Throughout the Ohio Valley and along the tributaries, such as the Great and Little Miami Rivers, the Muskingum and Scioto Rivers are numerous earthworks, most of which seem to have been fortifications, for the only general account of which I would refer you to "The Ancient Monuments of the Mississippi Valley," by Squier and Davis, published in 1848 as the first of the Smithsonian contributions to knowledge, in which will be found descriptions with plans of many of the earthworks of the Ohio Valley.

This diagram of a group of earthworks near Lebanon, Tenn., will serve to illustrate the general character of many similar places. An embankment encloses an irregular oval of about eleven acres in area. When the embankment was thrown up, it was probably near the banks of the stream called Spring Creek, but since its erection the creek has removed from its original bed about three hundred feet, cutting its way through a shelving limestone ledge, and is now bordered by a bluff of considerable height. This change in the bed of the stream furnishes a clew to the antiquity of the earthwork. The low embankment is surrounded by a ditch three or four feet deep, formed by removing the earth to raise the wall. There are three openings in the embankment, as if bridges might have been thrown over the ditch at these points. In the enclosure is a flat-topped mound two or three feet high, which exploration proved not to be a burial-mound, but probably the site of some structure. Near this large mound was a small one, only four or five feet high, containing sixty stone graves enclosing skeletons and objects buried with them. The little circles within the enclosure on the plan represent the sites of houses, like the earth circles described in the former lecture. Beneath the hard-clay floor, from one to two feet, the graves of children were found. It will thus be seen that this enclosure was a fortified village of about a hundred houses, protected by the ditch and embankment, perhaps also by palisades surmounting the embankment. Outside the enclosure are several mounds, which may have served as signal-stations.

At Newark, O., the earthworks covered an area of two miles square, and included, besides mounds, from fifteen to twenty miles of embankment, forming circles, squares, and other shapes, some of them enclosing from thirty to sixty acres, while parallel walls extended for about two miles. Of these embankments the highest is from fifteen to twenty feet high, and has a base sixty feet wide. These works do not seem to be of a defensive character, and although they may have formed a village site, they are generally believed to have been associated with the religious rites of the ancient people who erected them. A group at Portsmouth in some respects like that at Newark, probably served a similar purpose. It also had about twenty miles of embankment arranged as shown in this plan. A point of interest in the Portsmouth works is that they extend on both sides of the river, with parallel walls leading down to the river on either side, indicating the former presence of a bridge or easy crossing place. Unfortunately, only portions of the Newark and Portsmouth works are still preserved.

On the site of the city of Marietta, O., there were formerly two groups of square embankments enclosing a number of mounds, both flat-topped and conical. Outside the earthwork were several conical mounds, and the whole group has every appearance of having been the site of a fortified town. Many other groups similar to these occur in Ohio. Occasionally with the earthworks, walls of stone are found, as at one place on the Ohio river where an earth embankment is broken by a deep ravine across which a wall of stones seventy-five feet high was thrown, so uniting the interrupted earth wall.

A diagram of the great mound at Cakokia, Ill., opposite St. Louis, was next shown, in order to illustrate works of another character. This mound is to-day the largest in the United States, notwithstanding it has long been cultivated, and is much worn by repeated ploughings. It is ninety-seven feet high, and at different heights has several platforms or level places, each of considerable area. This mound was probably a village site, its steep sides serving for defence. When we consider that this mound covers an area of nearly twelve acres, and remember that all the earth composing it was brought a peck at a time in skins or baskets, we can form some idea of the labor expended in its construction.

Fort Ancient, Ohio, which is the special subject of my talk to-day, has given its name to the nearest railway station, some thirty-five miles northward from Cincinnati. It is built upon a hill running like a peninsula out from the plateau into the lowlands bordering the Little Miami river. This irregular-shaped hill was well chosen for a place of defence, for it is nearly isolated by streams tributary to the Little Miami. The top of the hill is 230 feet above the high-water mark of the river, which it completely commands. At the nearest point to the river the slope is terraced. The embankment is formed of earth, not thrown up from a ditch, as there is no ditch here, but from excavations, now pond-holes, here and there inside the fort. Where the embankment has been carried over gullies, a foundation of stones was made. The length of the embankment was nearly five miles. In height it varies at different points, ranging from fourteen to twenty feet, with a base often sixty feet wide. The frequent changes in the direction of the embankment as it follows the outline of the hill give an additional means of defence against an attacking force. The two larger ends of the fort are connected by a narrow neck of land along both sides of which the embankment runs, while across it is carried an embankment as if to hold one end in case the other end of the fort should be taken.

Just outside the main gateway or opening at the northeastern portion, are two mounds, from which parallel walls run out for 1350 feet to enclose a third mound at the end. Unfortunately, the parallel walls are in cultivated ground, and are now nearly obliterated, but they can still be traced.

This place was first remarked in 1806, and was carefully surveyed by Professor Locke about 1840, of whose excellent plan this diagram is an enlarged copy with a few additional points of interest introduced. Inside the earthwork there is no doubt much of interest which would well repay careful exploration. At one end of the fort, enclosing about forty acres, is a very old burial-place, whether of the people who built the work or of comparatively recent Indian tribes I do not know. At the other end of the fort, after many years of cultivation, the plough has recently struck a number of large flat stones evidently forming a pavement. On walking about the walls, which enclose an area of about one hundred acres, you find yourself in what is termed the primeval forest, and as it takes a long time for a second growth to be replaced by the primitive type of forest, with its several varieties of trees, we realize to some extent the antiquity of this remarkable fortification.

In the tray upon the table are a few fragments of pottery found near the ancient stone graves within the fort. Some are cord-marked and others are incised. Besides the bits of pottery, I picked up a fragment of cannel coal which had been cut and smoothed, as well as several flint chips and two rude arrow-points. These may represent the work of the people buried in the fort, or they may be of more recent origin. To determine the relative antiquity of the fort, of the people buried in it, and of the surface finds, demands most careful and conscientious work.

The preliminary steps have been taken to secure this most extensive of ancient American works for a public park, subject to necessary restrictions in order to preserve it for all time to come. It has stood the wear and tear of centuries, but it will not long withstand the encroachments of the American farmer. Inside the embankment the trees have all been removed and little ditches have been cut for draining, while on the crest of the embankment a rail fence has been built to exclude the cattle. As a result, the cattle have made a deep gully beside the fence, which is fast causing the embankment to wash away. It is a sad sight to see this remarkable place going to destruction, and we owe it to those who are to come after us to save this monument of antiquity. Unless something is done at once for its preservation, it will soon suffer the fate of the ancient works at Portsmouth and Marietta, of which but slight traces remain.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

December 20, 1882.

CARLSBRIDGE AND TOWER, PRAGUE.

THE Society met at 8 P.M., Vice-President Wm. H. Paine in the chair, John Bogart, Secretary. Mr. Wm. P. Shinn, M. Am. Soc. C. E., read a paper on the "Increased Efficiency of Railways for the Transportation of Freight."

The first portion of this paper gave from carefully gathered statistics a valuable amount of information in regard to the actual increase of traffic on American railways. In 1860 the tonnage-mileage of the New York Central and Hudson River Railroad, the Erie Railway and the Pennsylvania Railroad was about equal, and amounted in the aggregate to a little over three-fourths of that of the New York State Canals, and in 1870, each of these railroads averaged about the tonnage of the canals, and in 1880 they averaged each nearly double that of the canals. The aggregate tonnage-mileage of the other railroads was, in 1881, 1217 per cent more than 1860. Statistics were also given showing the increase of population, of railroad mileage, of the production and export of grain and other leading exports. The means by which the rapid increase of freight transportation had been developed was considered under two general heads, namely, improvements in the physical conditions of the railroads, and improvements in the administration. The improvements in the physical condition were treated on under these heads: —

1. Improved track or "permanent way," including bridge structure.
2. Additional sidings, and second, third and fourth tracks.
3. Increased capacity and strict classification of locomotives.
4. Increased capacity of freight cars.
5. Additions to terminal facilities.

The improvements in the administration were referred to under the following heads: —

6. Improved methods of signalling.
7. Running locomotives "first in, first out," and running freight trains at higher rates of speed.
8. Consolidation of connecting lines under one management by purchase, lease, amalgamation, or otherwise.
9. Running freight cars through from point of production to tide-water without trans-shipment.
10. Issuing through bills of lading (or freight contracts) from Western points of shipment to Atlantic and European ports.

The general introduction of steel rails was stated to be the very corner-stone of increased efficiency. The improvements in all the directions referred to were treated of and described at considerable length.

The second portion of the paper presented the views of the writer as to the means whereby still greater efficiency could be most economically obtained. The constant demand is for more transportation facilities for more cars. In the opinion of the writer, what is needed is not so much more cars as more movement of cars. Freight blockades will be prevented, not by having more tracks to stand cars upon, but by having fewer standing cars. It was shown that upon one railway there had been a decrease in the miles run by the cars of 21 per cent between 1868 and 1881, and that the Union Line cars between 1879 and 1882 were increased 49 per cent in number, while the mileage run by them decreased 16 per cent in the same period. The remedies suggested by Mr. Shinn were, more main tracks, more locomotives, more trains, the improvement of the making up of trains at the points where cars are loaded. The detention of cars at stations and private sidings, and the absence of cars on foreign railroads were considered as among the greatest causes of loss, and the writer suggests that the remedy will be to charge a per diem charge for cars when on foreign roads, and that this charge should be based upon the average economic value of the cars in use to their owners.

DECORATION OF ST. PAUL'S CATHEDRAL.[1]

THIS the author held to be the most absorbing art-topic of the day, and since the verdict of posterity depended on the success of the present generation in solving the problem, it behooved them to mark with a watchful eye every step taken, lest anything irremediably wrong should be done. The Cathedral authorities intended to submit the scheme for the decoration of the dome — the only part it was at present proposed to complete — to the public judgment before undertaking anything final. With such great interests at stake it was plainly most important that the public, who were to be the ultimate judges, should be kept well informed by the friendly discussions and enlightened criticisms of those most competent to form a correct opinion about the decoration of a church. In other words, duly qualified public opinion was that of a body of men of educated taste. Taste the author defined as the faculty of being able to discern beauty in nature and art — a definition which he defended and illustrated at sufficient length. In matters of architectural art where could the most competent judges be found if not amongst the members of their own Institute — men versed in niceties of style and modes of construction, gifted with an eye for form and color, who, by daily practice, by study, by travel, were the likeliest to have become men of cultivated taste?

[1] A paper read by Mr. R. P. Pullan, F. R. I. B. A., before the Royal Institute of British Architects, and published in its *Proceedings*.

Before that body, therefore, the author proceeded to lay the facts connected with the rise and progress of the movement. He did so with a view to showing that the steps taken hitherto had not been wisely taken and were likely to lead to results unsatisfactory to the world of art. The audience having been reminded that the decorations of St. Paul's are in the hands of a Sub-Committee, the author, whilst acknowledging the courtesy he had received from its individual members, felt bound to criticise their collective decision, in meeting with a polite *non possumus* a request laid before them by himself to consider another design to that adopted from Mr. Stephens as the basis of their own. Committees on art matters, as those present knew from sad experience, often, nay usually, arrived at decisions inimical to art and artists, and were sometimes guilty of injustice, chiefly because no member could be made individually responsible. Wren, himself, was much thwarted and persecuted by the Commissioners for the completion of our national Basilica. In an extant letter he pathetically complains that the painting of the cupola was taken out of his hands. Mr. Pullan referred to Sir Christopher's successive ideas as to the proper mode of decorating the dome, and spoke of Sir James Thornhill's paintings in the Cathedral, Greenwich Hospital and other buildings. He deemed it fortunate that Sir Joshua Reynolds's suggested realization in 1773 of Wren's desire by Members of the Royal Academy, six of whom volunteered their gratuitous services, fell to the ground. Otherwise, we should have had a medley of style and coloring which would have gone far to destroy the effect of the architecture. There would have been seen Sir Joshua's gentlemanly saints and West's namby-pamby scriptural subjects ranged side by side with Barry's bold martyrs, Angelica Kauffmann's delicate virgins, and, later on, Fuseli's grim demons. In 1853 Mr. Parris was employed to restore Thornhill's pictures. In 1858 Dean Milman, writing to the Bishop of London, urged that the adornment of St. Paul's should be carried out in a rich and harmonious style. An appeal was at once made to the wealthy citizens of London, and in a short time £24,000 was raised. By 1871 the subscription had reached £40,000. Thanksgiving Day for the recovery of the Prince of Wales sent up the fund to £56,000. With such large resources at their disposal, the Committee were on the look-out for a suitable design, and Mr. Burges, who had been appointed architect to the Cathedral in 1873, was instructed to prepare one, which was to be subject to Mr. Penrose's criticism. When it appeared, in the form of a model, at the Exhibition of the Royal Academy in 1874, it unchained the winds of controversy between High Church, Low Church, and No Church, and the battle of the styles was renewed. Mr. Penrose exhibited a rival design. Some of the contributors threatened to withdraw their subscriptions unless Sir Christopher's intentions — though nobody knew what these were — were carried out. The minority of the Committee vigorously protested, in June, 1874, against the majority's decision. All these influences told against the Cathedral architect, and in November of the same year the Dean and Chapter resolved to rescind the agreements made with Mr. Penrose and Mr. Burges. In Mr. Pullan's judgment there were many good points in the designs of both, and but for the violence of party spirit the work might have gone on. After the rejection of these designs there was a truce until 1876, when Mr. Oldfield published his very able letter to the Dean, in which he revived the whole subject. Of this pamphlet, and of its bearings on the problem of the decoration of St. Paul's, Mr. Pullan gave some account. He was, however, greatly scandalized by Mr. Oldfield's last recommendation to his colleagues on the Sub-Committee, which they had adopted. By it they were urged to dispense with an architect, and so to save money, whilst at the same time eliminating a frequent cause of divisions amongst their subscribers. Having repudiated architects, continued Mr. Pullan, they sought for a design from other sources, and at last unearthed a model on which Stevens, a sculptor lately deceased, had left some rough indications of his notion about the decoration of the dome of St. Paul's. The discovery of this model at that critical juncture was most opportune for them. It was a tower of defence for them against their foes. And they further strengthened their position by forming an alliance with the two greatest English painters of our day, Sir Frederick Leighton and Mr Poynter. With both of these eminent men they made a formal agreement stipulating that Stevens's design should be taken as a basis; that a full-sized colored cartoon should be placed *in situ*, one portion of which was to follow literally or with some modification Stevens's design, the other portion being of a more conventional or architectural form; but in any case Stevens's arrangement to be worked out and the frame to be filled with pictures, the subjects of which to be taken from those suggested by Mr. Oldfield in a second letter to the Dean — namely, scenes from the Apocalypse. The Dean and Chapter sanctioned the experiment, reserving to themselves full power of discussing the matter, and also of rejecting the cartoons if they should be unsatisfactory. Now what, asked Mr. Pullan, was Stevens's model? A half-dome on which were sketched roughly Titans, Telamones, angels and squatting figures arranged to form something like ribs, with circular medallions on a plain gold ground to receive the cartoons. The design was without any architectural character, the dream of a man who had Michael Angelo on the brain, and who was thought a man of the greatest genius, because he had executed a monument, full of fine details, to be placed in a position where they could never be properly seen. This was the Wellington monument—a canopied tomb adorned with groups of figures so placed that little beyond the soles of their feet could be visible to the spectator. This tomb was to have been crowned with an equestrian statue of the great captain whom it commemorated, placed in such a lofty position that his nodding plumes would almost have swept the ceiling of the Consistory Court. This figure, however, the artist was compelled by public opinion to omit. The result was the leaving out of the crown of the design, which was thus made to finish in a plain table top. Neither in the Wellington monument nor in the model for the dome did we recognize that perception of the fitness of things which was wont to characterize the man of the highest genius. Sir F. Leighton and Mr. Poynter, Mr. Pullan contended, ought never to have been pledged to adapt their pictures to Stevens's crude frame-work, which, with whatever proposed modifications, would always remain unworthy of the productions of their pencils. The prescribed selection from the Apocalypse of the figures to fill the upper and lower circles was no less severely and sarcastically criticised. It was objected that a more mystical subject, one less fitted for popular instruction or less likely to inspire devotion, could not have been chosen than that whose study had been said either to find or leave a man mad. Unless it had been meant to divert people's minds at sermon time, to occupy their thoughts with paradox instead of orthodoxy, one was at a loss to conceive how Mr. Oldfield came to pitch upon such a subject. Mr. Pullan spoke next of the genesis of the rival design, jointly prepared by himself and his brother architect and friend, the late Mr. Heath Wilson, of Florence. It was welded together in the fierce heat of their indignation on finding, when the Sub-Committee's report reached them in Italy in the summer of 1878, the architectural profession altogether ignored. The fundamental principles which guided the two friends in the production of their design[1] were then expounded and illustrated at large by the survivor, who afterwards read a description of it from the able pen of his late colleague. According to Mr. Heath Wilson, the Court of Heaven, as described in that grand triumphal hymn, the "Te Deum," commended itself to the judgment of the two friends, as offering subjects individually graphic, appropriate and impressive, and which, when united, might be brought effectually within the strict conditions of decorative art. They aimed at an embodiment of prayer, praise and thanksgiving as expressed in the "Te Deum." They prepared a drawing—one-sixth of the full size — of an eighth part of the dome, proposing to divide the entire circle into eight equal parts, by means of ribs, richly decorated and of large proportions. These would spring from eight thrones, each filled by a seated prophet, a figure, which, if erect, would be eighteen feet in height. These would form noble themes for a great artist's powers of design, admitting of exalted idealism and thoughtful action, combined with religious sentiment and fervor. The angels erect over the thrones, with extended wings and hands pointing heavenward, typified the union of the prophets with the spiritual world. Considered in a decorative sense only, these angels placed like statues round the dome resembled each other, yet with some variety of action, whilst their brilliant garments and wings contrasted with the rich, dark tones of the ribs. These dividing ribs bent inwards towards a common centre; they had foliated capitals at their summits, supporting an arcade, over which, surrounding the aperture of the dome, was an entablature, adorned in the frieze, pendentives and arches beneath, with winged cherubs, seraphs, and appropriate decorations of the usual forms and colors. The section of the visible portion of the outer dome could not be shown, but brilliant gold grounds were contemplated, to contrast with the azure beneath, embellished with heads of angelic beings, and in the summit of the lantern, as apex of the design, was to be the Lamb, as usually represented in Christian iconography. The spaces between the ribs were occupied in the lower portions of the curve of the dome with an architectural composition in two zones, consisting of a podium or basement with a corridor above, intended to recall in a measure the general design of Sir James Thornhill, which may have been approved by Sir Christopher Wren. This structure, with a baldacchino in each central space, was meant as background to the figures thronging this portion of the cupola. An Apostle was enthroned under each baldacchino: "The glorious company of the Apostles praise Thee." The martyrs were grouped on each side and in front of the basement: "The noble army of Martyrs praise Thee." The architectural forms, the ascending aërial perspective of which had been graduated with much care, were relieved against the pure azure of the whole upper curvature of the dome, on which depended, in considerable measure, the beauty of this part of the design. As the azure ascended it grew paler, till it melted into pure white. On the surface of this azure were ranged angels, excelling in brightness as they rose rank above rank, illustrating the verse of the hymn—"To Thee all Angels cry aloud." Recalling an arrangement in the Cathedral of Orvieto, it occurred to the designers, in this also following still more ancient examples, to place the virgin martyrs apart. They were placed under the corridor, but it was not to be understood that these figures were arranged in an arbitrary and final order. The design was a first composition, in which the authors had been more impressed with the importance of demonstrating the great leading principles of monumental and decorative art than in fixing any precise garland of verses from the hymn itself in this first essay. They had introduced Angels and other heavenly powers,

[1] Mr. Pullan exhibited a large painting of this design by the late Mr. Heath Wilson and himself.

Apostles, Prophets and Martyrs as appropriate and as eminently suitable for decorative treatment, but they were conscious that other noble themes presented themselves, especially in the verse, "The Holy Church throughout all the world doth acknowledge Thee." This subject, but for press of time, would have received their earnest attention and study; for when one considered the vast extent of the British Empire, and the number and variety of races under its sway, one grew sensible of the fitness of recalling, in our chief national temple, the great national duty of gathering in these peoples; the verse quoted offered a magnificent subject for illustration, and for introducing members of various races of mankind to be "numbered with Thy saints in glory everlasting."

NOTES AND CLIPPINGS.

Destruction of the Gate of St. Georges, at Nancy. — France sorely needs a Society for the Protection of Ancient Buildings. Scarcely is the demolition of the beautiful Saracenic Cathedral of Périgueux complete when we are informed that M. Duvaux, the new Minister of Instruction and Fine-Arts, has authorized the destruction of the old gate of St. Georges, at Nancy. This gate is almost intact. It was built in 1608, by Charles III, Duke of Lorraine, and is almost the only portion of Nancy, as he left it, which remains. The Commission des Monuments Historiques, which does not possess quite the weight or prestige which we could desire for it, has appealed against the act, and a strong movement is being made to induce the Government to reconsider the matter. Four years ago the demolition of this monument was delayed by the representations of the inhabitants, and Victor Hugo at that time wrote a letter pointing out that the Porte Saint-Georges was one of the most charming buildings of the Renaissance, and demanding its preservation. This letter is now being printed and circulated by a committee of the townspeople of Nancy, and will probably figure prominently in the interpellation of which MM. Clovis, Hugues, and Antonin Proust have given notice to the Chamber. — *Pall Mall Gazette.*

How the Pictures in the Louvre are Cleaned. — A correspondent of the Philadelphia *Evening Bulletin* has taken the pains to find out how the galleries and the pictures in the Louvre are kept clean. On Mondays the palace is closed; it is then that the weekly cleaning takes place. The first thing done is to cover the floor with damp sawdust to the depth of an inch or so. Oak sawdust is used for the boards and elm dust for the marbles. This is allowed to remain some time and is then removed, and with it goes every particle of dust or dirt which may have adhered to the floor. Then the men buckle on to their feet large stiff brushes, and, armed with a stout stick, to one end of which is fastened a great piece of prepared beeswax, they first rub the floor with wax, then skate over it with their brushes, and finally give it the finishing polish with a great woollen cloth made expressly for this purpose. The same cloth is passed daily over the floor before the opening of the museum, which is all that is required until the following Monday. In this way no dust arises, and the pictures need rarely to be cleaned. When this becomes necessary, which happens about once in four or five years, the museum is closed for several days. No one is allowed to touch a picture unless the "conservateur du musée" be present. The pictures are taken down, and it is the "conservateur" himself who places a thick sheet of clean wadding over the painting, pressing it down gently in such a way that every particle of dust adheres to the wadding. After this is done a thin coat of oil or some mixture which replaces it is rubbed on, and the picture is not again touched until the next general house-cleaning.

Armenian Antiquarian Discoveries. — The *Allgemeine Zeitung* announces that a discovery, the importance of which can hardly be overrated, has been made lately by a Bavarian archæologist, Herr Sester, at the point where the Euphrates bursts through the Taurus range. Here, in a wild, romantic district, lying between Madatieth and Sanisat, he found a line of megalithic monuments, averaging between 16 metres and 18 metres in height, and bearing inscriptions. They are in a remarkable state of preservation, and Herr Sester has no doubt that they formed part of some great national sanctuary, dating back some 3,000 years or more. There was formerly at this place a necropolis of the old Commagene kings, so that it seems reasonable to attribute these colossal monuments to this ancient people, the hereditary foes of the Assyrians. Very little is known about them. The classical writers allude to them only in casual passages, and the arrow-headed inscriptions, although mentioning them very often, have hitherto yielded scanty information. Herr Sester purposes visiting the place next year, accompanied by Dr. Puchstein, a pupil of the Berlin Archæological Institute. Meantime, it is conjectured that they will be found to belong to the class of remains which Professor Sayce has designated "Chettite monuments," all that has come down to us from the once powerful race of the Chetta or Chatti.

How the Louvre gains a Collection. — Prince Filangeri, of Naples, has just experienced the rapacity of Italian tax-gatherers, and is greatly displeased. *The London Globe* relates that he "had offered his splendid museum of antiquities and works of art to Naples as a free gift. The offer was, of course, accepted, and the municipal authorities addressed to their benefactor a most gracious letter of thanks. But the Commissioners of Inland Revenue addressed to the Prince a demand which altered his views. This was nothing less than a request for 300,000 lire on account of the tax upon alienation in respect of his gallery." Prince Filangeri on receiving the notice at once went to the Minister of Finance in Rome and said: "I am resolved that on no consideration, cost me what it may, shall the town of Naples have a bronze or a statuette out of my collection. I am offered three rooms at the Louvre in Paris, and to them I shall transfer my galleries. But on the doors of the collection, when there displayed, will be found a placard to this effect: 'This museum was intended for the town of Naples; the rapacity of the Italian Treasury forced the owner to send it to a foreign country.'"

Manufacturing Alumina. — An invention which it is believed will effect important changes in the metal trade, not only in this country but throughout the world, has recently been patented in Great Britain and most foreign countries, and is now being sold as an article of commerce. The invention consists of a new method of manufacturing alumina by which nine-tenths of the present cost are saved, while it can be made in immense quantities in the course of a few days instead of requiring nine months to produce it, as was formerly the case. The inventor is Mr. Webster of Hollywood, near Birmingham, who has been engaged in experiments since 1851, and only succeeded in perfecting his process about twelve months ago, after having expended nearly £30,000 in the experiments. Prior to this invention, alumina was made only in France, the attempt to introduce the manufacture into England having failed after the promoters had lost upwards of a million of money. The extent and value of the discovery may be gathered from the fact that a French syndicate have offered no less than nearly half a million for the patent rights in France alone, and companies in the United States have offered £1,000,000 for the right of manufacture in America, while the Belgians and Germans are also negotiating for the purchase for their respective countries. The ordinary method of making alumina is by precipitation, and the cost is no less than £1,000 a ton, whereas by Mr. Webster's process the cost is reduced to less than £100 a ton. When converted into aluminum and alloyed with copper, tin and other alloys, it produces a bronze metal which is considered to be superior to anything in use for ship fittings, steam-ship propellers, and also for the manufacture of artillery. Although it has only just been placed in the market, the bronze is in extensive demand by ship-builders, and the British Government are in treaty for a supply of the metal to the Royal Gun Factory at Woolwich. A scientific analysis shows that the aluminum bronze has a resisting power of forty-two tons per inch as compared with twenty-eight for gun-metal and thirty for Bessemer steel. At the same time it is exceedingly ductile and tenacious, and when used for ships, will bend rather than break from the force of a collision. The metal is supplied in ingots, rolled into sheets or drawn into wire. In its different forms it may be used for all purposes for which electro-plating is now employed, also for pen-making, nail-making, bell-founding, and even for jewelry. Rings of the aluminum bronze set with precious stones are in vast demand for the United States, and spoons, knives and forks, dish-covers, railway-carriage door-handles and other articles made from the metal are in extensive inquiry in this country.—*Birmingham Correspondent London News.*

Furnace Slag and Bauxite for Cement. — We learn from *Stahl und Eisen* that Herr Roth, mining engineer, of Wetzlar, uses bauxite in the manufacture of cement from blast-furnace cinder. Bauxite consists principally of alumina hydrates, besides small quantities of sesquioxide of manganese, titanic acid, lime, magnesia, alkali, etc., but its chemical composition varies according to the localities where it is deposited. Its name is derived from the place where it was first discovered, Les Baux, in France; it also occurs in the Charente. In Italy it is found in Calabria; in Ireland, near Belfast; in the Austrian Empire, in Krain, Styria, and Lower Austria. In Germany bauxite occurs on the southern slope of the Westerwald, near Mühlbach and Hadamar, also at the Vogelsberg, in Upper Hesse, and at Klein-Steinheim, near Hanau. If 100 parts of furnace cinder, which crumbles by itself, are mixed with 85 parts of limestone or chalk (containing 98 per cent of carbonate of lime and 2 per cent of silicic acid), and 15 parts of bauxite (containing 48.5 per cent of alumina, 13.52 per cent of sesquioxide of iron, and 9.40 per cent of silicic acid, the composition of the bauxite found near Giessen), and burned, the product yielded—supposing that half of the sulphur escapes from the slag as sulphurated hydrogen — is 158.66 parts of cement of the following composition: Lime, 61.9 per cent; silicic acid, 24.1 per cent; alumina, 10.6 per cent; sesquioxide of iron, 1.3 per cent; protoxides of iron and manganese, 0.8 per cent; magnesia, 1 per cent; sulphur, 0.3 per cent. The cinder used was obtained in the production of foundry pig in a coke blast-furnace. If the cinder to be employed is of a different composition, the fluxing materials must be varied. Herr Roth demonstrates the economical advantages to be derived from the erection of special cement mills near blast-furnaces.—*Van Nostrand's Engineering Magazine.*

Veneering. — Veneering, says the London *Furniture Gazette*, seems to have originated contemporaneously with the art of cabinet-making. The superimposing thin layers of choice wood upon articles made of common timber was in use among the Egyptians some 1,500 years B. C. Recent advances made in veneering furniture and cabinet-work are said to be noteworthy. One process of making veneers, invented by a German, is detailed at length as to its results. The method is said to be secret. The production is said to be practically a "paper veneer." Several varieties of choice woods of considerable thickness are "inlaid" to form a pattern. Thin layers of these produce fine effects, and may be used for a large variety of purposes, extending to dadoes, friezes, table-tops, wall-coverings and the like. The opportunity for skill and ingenuity to produce rich effects in the combination and blending of the different woods, together with the patterns formed, is readily perceived to be large.

Systematic Station Building on the C. P. Railroad. — When the building superintendent of the Canadian Pacific commenced the work of erecting stations on July 1, the track-layers were over 100 miles in advance of him, but at the close of the year the last station will be built at the end of the track. During the season he has constructed twelve stations, twelve section-houses, eleven permanent water-tanks and sixteen temporary ones. He has had a force of 250 men in his employ, and his pay-roll has amounted to $16,000 per month. His plan of operations has been similar to that employed in track-laying. One gang of men would be detailed to erect the frame of a station-house, and then sent on to the next point, while their places would be filled by the next carpenters, roofing in the building, putting in the floors, etc., who would in turn be superseded by the joiners and plasterers. This course was followed throughout the season, four or five buildings being in process of construction at the same time, thus avoiding delay.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

269,824. KEY-HOLE GUARD. — Joshua Brown, Quincy, Mass.

269,849. COMPOUND FOR THE MANUFACTURE OF ARTIFICIAL STONE. — Joshua A. Greer, Galveston, Tex.

269,855. SAFETY-APPLIANCE FOR ELEVATORS. — Lionel H. Heynemann, San Francisco, Cal.

269,859. NAIL. — John H. Hughen, Athens, Ga.

269,860. ORAL ANNUNCIATOR. — Joseph Ireland, Cleveland, O.

269,862. ELECTRIC BURGLAR-ALARM. — Charles Temple Jackson, New York, N. Y.

269,863. IRON AND ILLUMINATING STAIRS. — Peter H. Jackson, San Francisco, Cal.

269,873. HEATING-FURNACE. — Henry W. Michael, Denver, Col.

269,902 SOCKET-WRENCH. — Henry Wheeler, Chambersville, Mo.

269,921. CISTERN FOR WATER-CLOSETS. — John Demarest, New York, N. Y.

269,930. AUTOMATIC FIRE-EXTINGUISHER. — Alphonso S. Harris, Chelsea, Mass.

269,965. PNEUMATIC FIRE-EXTINGUISHER. — William Sellers, Philadelphia, Pa.

269,967-968. BENCH PLANE. — Jacob Siegley, New York, N. Y.

269,983. HOUSE-COOLING DEVICE. — Andrew Zerban, New York, N. Y.

269,986. SPRING-HINGE. — James H. Alexander, Philadelphia, Pa.

269,994. ELEVATOR. — Walter M. Bailey, New York, N. Y.

270,008. LADDER. — Charles Bridges, San Fernando, Cal.

270,010. FIRE-EXTINGUISHER ALARM APPARATUS. — Albert M. Burritt, Waterbury, Conn.

270,011. FIRE-EXTINGUISHER. — Albert M. Burritt, Waterbury, Conn.

270,027. WINDOW-SHUTTER OPENER. — John J. Donahoe and Peter J. Finn, New Orleans, La.

270,034. MERCURY-SEAL-JOINT TRAP FOR BATH-TUBS, ETC. — Abraham Edwards, Asbury Park, N. J., and Samuel J. Van Stavoren, Philadelphia, Pa.

270,038. EAVES-TROUGH HANGER. — Henry J. Erwin, Marysville, O.

270,044. DOOR-CHECK. — F. William Fieder, Chicago, Ill.

270,047. IRON SHUTTER. — Newman A. Foss, Gold Run, Mont.

270,053. STEAM-RADIATOR. — Patrick Gormly and Lewis Bridge, Philadelphia, Pa.

270,066 COCK AND FAUCET. — Francis Hickman, New York, N. Y.

270,072. BIT-STOCK. — William A. Ives, New Haven, Conn.

270,080. WATER-CLOSET. — John Kelly, Chicago, Ill.

270,097. HYDRAULIC CEMENT. — John Murphy, Columbus, O.

270,111. TRAP FOR WASH-STANDS, ETC. — Charles F. Pike, Philadelphia, Pa.

210,112. SEALING DEVICE FOR THE OPERATING MECHANISM OF WATER-CLOSETS. — Charles F. Pike, Philadelphia, Pa.

270,113. WATER-CLOSET. — Charles F. Pike, Philadelphia, Pa.

270,118. APPARATUS FOR CLEANING CISTERNS. — W. M. Prather, Kansas City, Mo.

270,127. HEATING-FURNACE. — David W. Robb, Amherst, Nova Scotia, Can.

270,132. ILLUMINATING-TILING FOR VAULTS, ETC. — C Hansen Ross, Chicago, Ill.

270,151. PLASTIC COMPOUND FOR ROOFING. — Chas. Taylor, Montreal, Quebec, Can.

270,175. FIRE-BRICK. — William Batty, Philadelphia, Pa.

SUMMARY OF THE WEEK.

Baltimore.

CHURCH. — Mr. George A. Frederick, architect, has submitted drawings for an alteration in the tower and spire of the German Evangelical Church on Canton Ave., near Broadway; cost, $8,000.

HOUSE. — Mr. Chas. L. Carson, architect, has prepared drawings for a three-st'y and mansard residence, 25' x 103', on Eutaw Pl., for Mr. Frank, of Messrs. Frank & Adler, of this city; cost, $35,000.

WAREHOUSE. — Corner Light and Balderston Sts., for Mr. Albert Gottschalk, 37' x 117', brick, with brownstone and terra-cotta finish; cost, $50,000; Geo. A. Frederick, architect.

BUILDING PERMITS. — Since our last report ten permits have been granted, of which the following are the more important: —

Wm. Brown, two-st'y brick building, w s Parrish Alley, between Winchester and Tennant Sts.

Jos. Rosenberger, three-st'y brick building, with two-st'y brick back building, e s Central Ave., between Hoffman and Oliver Sts.

Wm. Roehler, three-st'y brick building, n s McElderry St., between Choptank St. and Madison Alley.

C. F. Richler, 7 three-st'y brick buildings, with two-st'y brick back buildings, w s Druid-Hill Ave., between Roberts and Laurens Sts.; and 7 three-st'y brick buildings, with two-st'y brick back buildings, s s Roberts St., between Druid Hill Ave. and Etting St.

Benj. R. Schneider, three-st'y brick building, s s Chase St., w of Valley St.

———, 3 three-st'y brick buildings, with two-st'y brick back buildings, e s Pennsylvania Ave., between Mosher and McMechen Sts., and 3 two-st'y brick buildings in their rear, on w s Bouldin Alley.

Wm. H. Wehn, 2 three-st'y brick buildings, with two-st'y back buildings, n s Fayette St., between Mount and Fulton Sts., and 3 three-st'y brick buildings, w s Mount St., between Fayette and Lexington Sts.

John W. Gibbs, 2 three-st'y brick buildings, with two-st'y brick back buildings, w s Carey St., between Pratt and Lombard Sts.

ALTERATION. — Mr. L. Meyer is making an alteration and addition to his store, on Hanover St., near Pratt St.: cost, $1,000; Mr. Briel, builder; Geo. A. Frederick, architect.

Boston.

CONTRACT. — The contract for plumbing-work on the sub-treasury extension of this city has been awarded to Dalton & Ingersoll, at their bid of $10,095.34.

Brooklyn.

BUILDING PERMITS. — *Floyd St.*, s s, 425' e Sumner Ave., 2 three-st'y frame tenements, tin roofs; cost, each, $4,000; owner, Chas. Maurer, Floyd St.; builders, Geo. Straub and J. Rueger.

Hooper St., n s, 100' e Bedford Ave., 2 three-st'y brownstone front dwells., tin roofs; cost, each, $6,000; owner, Fredk. Hoeft; architect, E. F. Gaylor.

Atlantic Ave., s s, 236' e Rockaway Ave., 4 two-st'y frame tenements, gravel roofs; cost, each, about $2,500; owner and builder, Chas. J. Holmmer; architect, F. F. Thomas.

Central Ave., *No.* 78, 75' s e Melrose St., three-st'y frame double tenement, tin roof; cost, $4,000; owner, John Schnappauf, 206 Meserole St.; architect, G. Hillenbrand; builder, D. Kreuder.

Plot 400, n Greenpoint Ave., and about 250' w Newton Creek, one st'y brick building, gravel roof; cost, $3,850; owner, Central Refining Co., Greenpoint; architect, G. H. Budlong; builders, J. Rooney and T. Davis.

Fourth Ave., s e cor. Seventh St., 3 three-st'y brick tenements, gravel roofs; owners, L. J. Praether & Co.; architect, L. J. Praether; builders, M. Sohlrop & Co.

Lafayette Ave., n s, 100' w Lewis Ave., 16 two-and-a-half-st'y frame dwells., tin roofs; cost, each, $3,500; owner P. F. O'Brien, 162 Hewes St.

Suydam St., n s, 100' e Broadway, 2 two-st'y frame tenements, tin roofs; cost, each, $2,800; owner and builder, Fr. Herr, 778 Broadway; architect, W. Clemett.

Plot, 500' n Greenpoint Ave., and about 250' w of Newtown Creek, one-st'y brick boiler-house, gravel roof; cost, $6,250; owner, Central Refining Co., Greenpoint; architect, G. H. Budlong; builders, Jas. Rooney and Thos. Davis.

Twentieth St., s s, 275' e Third Ave., 2 three-st'y frame tenements, felt roofing; cost, each $3,000; owner, Wm. H. O. Greene, 230 Twentieth St.; architect, Wm. Wirth; builders, A. McGrath & J. R. Greene.

Third Ave., n e cor. Fortieth St., three-st'y frame store and tenement, tin roof; cost, $3,500; owner, Michael Hanrehan, Fifth Ave., cor. Twentieth St.; architect and builder, Francis Ryan.

Rodney St., s s, 100' w Wythe Ave., two-st'y brick dwell., tin roof, iron cornice; cost, $6,000; owner, Wm. Wendt, on premises; architect, E. F. Gaylor; builder, Thomas Gibbons.

La Fayette Ave., n s, cor. Sumner Ave., 9 two-st'y frame dwells., tin roofs; cost each, about $3,500; owner, Chas. I. De Bevoise, 104 De Bevoise Ave.

Reid Ave., s w cor. Lexington Ave., three-st'y brownstone front store and tenement, tin roof; cost, $7,000; owner, architect and builder, Jas. A. Thompson, 300 Lexington Ave.

ALTERATIONS. — *Second St.*, w s, 125' s Broadway, three-st'y brick extension, tin roof; cost, $2,500; owner, Henry Meyers, on premises; builders, J. McQuaid and Jenkins & Gillies.

Chicago.

BUILDING IN 1882. — The building in the past year in this city was never exceeded, except in 1872, the year succeeding the great fire. Even then the amount of building was only twice as great as in the past year, and the amount of ground covered by structures was less than twice as great. Five thousand six hundred and thirty building permits have been issued; the frontage of the new structures, lineal measure, is fourteen miles; the total cost of buildings on permits, $17,500,000; total, probably $20,000,000. The suburban towns show an equal growth and building prosperity. The character of the edifices is generally improved. — *Cincinnati Commercial.*

BUILDING PERMITS. — Willard F. Myrick, 5 two-st'y and basement brick dwells., 21' x 41' each, Twenty-ninth St., cor. Cottage Grove Ave.; cost, $18,000.

John Lauritzen, 2 two-st'y brick dwells., 21' x 50' each, 3633 and 3635 Dearborn St.; cost, $8,000.

Wm. E. Hale, alterations on building, s w cor. State and Washington Sts.; cost, $25,000.

A. S. Lehman, two-st'y and attic brick dwell., 24' x 56', 96 Vernon Park Pl.; cost, $3,000.

Thos. Jones, three-st'y brick dwell., 22' x 44', 324 West Jackson St.; cost, $5,000.

Barbara Titus, 4 three-st'y brick stores and dwells., 60' x 100', 123 to 129 Thirty-fifth St.; cost, $23,000.

Geo. Harding, two stories additional, 30' x 180', 170 Madison St.; cost, $10,000.

Ira Brown, 6 two-st'y brick dwells., 40' x 120', Nos. 143-748 West Jackson St.; cost, $30,000; Cleverdon & Gay, architects.

W. Mathews, Reformed Episcopal Church, one-st'y brick church, 36' x 66'; 823 Larrabee St.; cost, $2,500.

Hans P. Schilling, four-st'y and basement brick store, 20' x 140', 41 South Water St.; cost, $12,000.

Thos. Minchen, three st'y brick dwell., 26' x 40', 57 East Pearson St.; cost, $7,000.

F. E. H. Hawkins, four-st'y and basement brick dwell., 18' x 40', 49 Peck Court; cost, $10,000.

Norman Bridge, two-st'y and basement brick dwell., 22' x 62', 550 West Jackson St.; cost, $12,000.

John J. Shutterly, two-st'y brick dwell., 24' x 40', 716 Ohio St.; cost, $3,000.

Toolen & Maloney, 2 three-st'y brick stores and dwells., 48' x 60', 3610 and 3612 State St.; cost, $15,000.

Cincinnati.

HOUSES. — Mr. E. Anderson, architect, has prepared plans for a frame dwell., to be built at Hartwell, near Cincinnati, for Mr. John Hornbrook; cost, about $7,000.

Mr. E. Anderson is building a brick house for Mr. Chas. Miller, County Treasurer, at Cumminsville; cost, $6,000.

BUILDING PERMITS. — John H. Empson, 4 two-st'y brick dwells., s w cor. of Hand and Clark Sts.; cost, $5,000.

J. A. Kuhlman, 2 two-st'y brick dwells., Carr St., near Jefferson St.; cost, $6,000.

Two permits for repairs; cost, $2,000.

New York.

CHAPEL. — A picturesque frame chapel, in the Gothic style, is to be erected by the Jesuit Fathers, on Blackwell's Island, from designs of Mr. Jos. M. Dunn.

NEW BUILDING COMPANY. — The certificate of incorporation of "the Bowling-Green Building Company of the City of New York" has been filed in the County Clerk's office. The object of the company, whose capital stock is fixed at $1,000,000, is stated to be to erect buildings in this city. The corporators are William Grenelle, John O. Stevens, and Louis S. Phillips.

SYNAGOGUE. — The Jewish Congregation Shaareh Berochoh has just purchased a lot for a new synagogue.

CONTRACTS. — The Neuchatel Asphalt Co. have contracts for laying with their Val de Travers Rock Asphalt: roofs of No. 8 Pine St.; of No. 444 Canal St.; of apartment-house No. 121 Madison Ave.; of Columbia College Observatory; floor and sidewalk of building of Manhattan Storage & Warehouse Co., Fortieth St., cor. Lexington Ave.; the roof and all the floors of the building of the Lincoln Safe Deposit Co., Madison Ave. and Forty-second St.; and the platforms of stations at New York and Brooklyn ends of the East River Bridge.

OFFICE-BUILDING. — Mr. W. P. Anderson is drawing plans for a large office-building, to be erected for Mr. Twombley, on Beaver St.

RESIDENCE. — For Mr. Adolph Krebs a fine residence is to be built, of brick and stone, on Fifth Ave., 25' s of Eightieth St. It will have a frontage of 25' 6", and be four st'y, with basement; Messrs. D. & J. Jardine are the architects.

BUILDING PERMITS. — *East Sixty-fourth St.*, *Nos.* 321, 323 *and* 325, three-st'y brick storage-building and stable, gravel roof; cost, $5,000; owner, Geo. Mulligan, 33 East Thirty-second St.

Pike Slip, w s, between Cherry and Walter Sts., seven and part eight st'y brick flour-mill; cost, $75,000; owner, Geo. B. Hecker, 278 Madison Ave.; architects, Wm. Field & Son.

Eighty-second St., s s, 375' e Second Ave., five-st'y brick tenement, tin roof; cost, $16,500; owner, Lottie Teebald, 1341 Lexington Ave.; architect, John Brandt.

Canal St., junction of Walker St., seven-st'y brick factory, tin roof; cost, $45,000; owners, Oxley Giddings & Enos, 28 Monroe Place, Brooklyn; architects, Wm. Field & Son.

Broadway, s e cor. Prince St., 2 six-st'y brick stores, concrete and tin roofs; cost, each $150,000; owner, Wm. Astor, 23 West Twenty-sixth St.; architect, Thos. Stent.

Bowery, *No.* 251, three-st'y brick store and dwell., tin roof; cost, $20,000; owner, John Jacob Astor, 21 West Twenty-sixth St.; architect, Thos. Stent; builders; Jas. Webb & Son and J. Downey.

One Hundred and Eleventh St., n s, 195' 11" w of St. Nicholas Ave., 6 three-st'y brick dwells., tin roofs; cost, each $8,500; owner, Edward J. King, 317 Fifth Ave.; architects, D. & J. Jardine; builders, John P. Schweikert and Griener & Fansel.

Broome St., *No.* 328, four-st'y brick tenement and store, tin roof; cost, $12,000; owner, Mary L. Patten, 113 East Fifty-seventh St.; architect, Wm. Graul.

Fifty-third St., s s, 103' w of Lexington Ave., 4 five-st'y brick tenements, tin roofs; cost, each $15,000; owner, John Davidson, 116 East Fifty-sixth St.; architect, A. B. Ogden.

Pike St., *No.* 76, five-st'y brick tenement, tin roof; cost, $12,000; owners, Theodore H. Calam et. al.; architect, Jas. S. Wrightman.

Pike St., *Nos.* 78 *and* 80, 2 five st'y brick tenements, tin roofs; cost, each $16,000; owners and architect, same as last.

Pike St., *No.* 82, n w cor. Cherry St., five-st'y brick tenement, tin roof; cost, $21,000; owners and architect, same as last.

ALTERATIONS. — *Murray St.*, *No.* 77, repair damage by fire; cost, $3,700; owners, Thos. Adams & Sons, 297 Waverly Pl.; builder, Henry Wallace.

Broadway, s w cor. Forty first St., to Seventh Ave., internal alterations; cost, $15,000; owners, the Metropolitan Concert Co.; lessee, Sylvester M. Hickey; architect, H. J. Dudley.

Grand St., *No.* 253, repair damage by fire; cost, $2,500; owner, estate of R. Cochran, A. W. Hardman, agent, 416 Broome St; builder, John Leslie.

Rivington St., *No.* 43, roof raised, also a one and three st'y brick extension; cost, $2,000; owner, Chas. Forschner, 39 Rivington St.; architect, Fred Jenth.

East Fourteenth St., *Nos.* 116 *and* 118, repair damage by fire; cost, $6,420; owner, Wm. C. Schermerhorn, 68 Wall St.; architect, D. Linau; builders, Ben Blackledge and L. N. Williams.

Philadelphia.

BUILDING PERMITS. — *Alder St.*, w s, n of Norris St., 2 two-st'y dwells., 14' x 28'; Michael Smith, owner.

Terrace St., n w cor. Adams St., one-st'y Mission building, 38' x 59'; S. Yardley, owner.

Tenth St., *No.* 968, addition to brick building, 15' x 31'; N. S. Bowers, owner.

Terrace St., e s, n of Shur's Lane, 2 two-st'y dwells.; 14' x 46'; David Harper, owner.

Cumberland St., n w cor. Mill St., two-st'y addi-

tion to factory, 30' x 32'; D. S. McKnabb, contractor.

Main St., e of Shur's Lane, rebuilding factory, 52' x 150'; S. S. Keely, contractor.

South Twenty-eighth St., Nos. 1113 *and* 1115, 2 two-st'y dwells., 14' x 21', Geo. Mowbray, owner.

Sophia St., w s, s of Edward St., 2 rebuilding foundries, 17' x 80' and 20' x 100'; T. Shoemaker, contractor.

Broad St., s w cor. Catharine St., two-st'y stable, 17' x 32'; Chas. O'Neill, contractor.

Eardman St., n of Perkiomen St., two-st'y dwell., and one-st'y stable, 16' x 26' and 14' x 65'; James McCartney, contractor.

Thirteenth St., e s, s of Cherry St., third, fourth and fifth st'y addition to brick building, 21' x 40'; Jno. Mundell, owner.

Spruce St., No. 3909, two-st'y addition to brick building, and interior alterations, 16' x 20'; E. L. Hall, owner, Woodbury, N. J.

ADDITIONS. — Addition and alteration to residence of W. S. Blight, Pine St., above Broad St.; Hazlehurst & Huckel, architects.

Addition and alteration to residence of Mrs. H. J. Biddle, Walnut St., w of Sixteenth St.; Hazlehurst & Huckel, architects.

St. Louis.

BUILDING IN 1882. — Investigation shows that during the year 1882 prosperity in business circles in St. Louis has been the rule. There has been a slight decline in business during the past three months, but on the whole the volume of trade has greatly increased over that of last year. The year has been remarkable on account of the number, variety and costliness of the new buildings which have been erected. The total estimated value of all the improvements of this character which were projected is $5,385,012.50, or nearly $1,000,000 in excess of last year. During the year there have been issued 2,631 building permits, of which only 715 were for frame structures. The five most important buildings completed during the year were the new Belcher Sugar Refinery, the Olympic Theatre, the new College of the Christian Brothers, the Gay Building, and the Leighton Building, which together cost upward of $1,000,000. The Belcher Sugar Refinery is thirteen stories above the basement, and nearly 8,000,000 millions of bricks were used in its construction. — *N. Y. Commercial Advertiser.*

BUILDING PERMITS. — Six permits have been issued since our last report, of which two are for unimportant frame houses. Of the rest those worth $2,500 and over are as follows: —

Trustees of U. M. E. Church, two-st'y brick church; cost, $7,000; A. Beinke, architect; sub-let.

A. J. Cramer, two-st'y brick dwell.; cost, $2,500; A. J. Cramer, architect and builder.

Syracuse, N. Y.

HOUSES. — A stone house for Mr. H. G. White is in process of erection. Foundations and enclosing, $32,000; architect, H. Miller, of Ithaca.

Mr. L. D. Dennison is building a frame house on James St.; A. Russell, architect.

A. F. Lewis is building a two-st'y and attic frame house; architect, J. L. Silsbee; builder, C. Wiehorn, Jr.

Rev. C. N. Sims, Chancellor of Syracuse University, is building a two-st'y frame house; cost about $1,500; builder, C. Wiehorn, Jr.; architect, E. M. Buell.

Dr. G. D. Whedon is building new offices; cost about $1,000; builders, G. Schattle & John Schatler; architect, E. M. Buell.

FACTORY. — Mr. Christian Cook is building a factory on W. Onondaga St., brick and stone; cost, about $10,000; C. & L. Merrick, builders; A. L. Merrick, architect.

GOVERNMENT BUILDING. — The Commission appointed to select a site for the new Post-Office and Government Office Building, to be erected here, have reported in favor of St. Paul P. E. Church property, situated near the centre of the city and well fitted for the purpose. The lot is 100' x 132'; $70,000 is asked for the property.

WAREHOUSE. — Sperry, Neal & Hyde will build a five-st'y brick and stone block for a wholesale dry goods house; Mr. A. L. Merrick is the architect.

The numerous buildings just completed and now in course of erection show that this enterprising little city is growing fast. The prospects for the spring are full of promise for builders and architects.

Bids and Contracts.

BUFFALO, N. Y. — The contract for iron stairs for the Fitch Institute (as per advertisement in *American Architect*) was let on the 29th to Poulson & Eger for $4,100; plumbing to J. D. Smith, of Buffalo, for $2,000; J. G. Cutler, of Rochester, architect.

YORKTOWN, VA. — The following bids for the erection of the Yorktown Monument have been received: —

No. 1, Daniel C. Hutchinson, No. 137 Chambers St., New York, and Washington, Mass., $74,000.

No. 2, Mount Waldo Granite Company Works, John T. Roe, Frankfort, Me., $74,500.

No. 3. Weston Granite Company, Virginia, R. Snowdon Andrews, President, $74,987.87.

No. 4. Bodwell Granite Co., Rockland, Me., R. H. Lowrey, President, $60,436.

No. 5. Hallowell Granite Co., Hallowell, Me., $58,500.

No. 6. Davis Tilson, Rockland, Me., $60,000.

No. 7. Brown, McAllister & Co., New York, $115,000.

No. 8. Hallowell Granite Co., J. R. Bodwell, President, Hallowell, Me., $59,487 if built of Hallowell granite; $59,939, if built of Westerly granite, and $5 extra for each letter of the inscriptions if they are to be raised.

No. 9. E. C. Sargent, of the Concord Granite Co., Concord, N. H., $99,000. The latter bid was not on the regular blanks prepared for the purpose, and was declared informal.

The bid will be presented to the Secretary of War, and on his judgment the award will be made.

General Notes.

ALTOONA, PA. — A $65,000 opera-house is to be built for Mr. J. Schenck. Work will be commenced soon and it is to be completed by the fall.

BALTIMORE CO., MD. — Suburban residence, for Mr. J. D. Mallory, frame, 50' x 80', with stable and carriage-house that cost $4,500; total cost, $32,000; John C. Cress, of Waverly, Baltimore Co., builder; Geo. A. Frederick, Baltimore, architect.

CALEDONIA, N. Y. — Plans are being prepared for a stone church, by Oscar Knebel, architect.

CARLISLE, PA. — Presbyterian Chapel, 40' x 75'; to be built of local stone; Hazlehurst & Huckel, architects, Philadelphia, Pa. A public reading-room is included in above building.

CONSHOHOCKEN, PA. — Plans for the Tradesman's National Bank have been prepared by Hazlehurst & Huckel, architects, Philadelphia, Pa.

DENVER, COL. — Mr. W. J. Fay is to build two brick houses on Kansas Ave.; cost, $5,000.

DETROIT, MICH. — The returns of the Fire Marshal for 1882 show that the value of the new buildings authorized during the year amounts to $3,057,064; repairs, $383,017. This is an increase of $1,000,000 over 1881.

FALL RIVER, MASS. — The mayor's late address recommends the issue of bonds for the erection of a high-school building, and then the creation of a sinking-fund of $5,000 or $10,000 a year to pay for it. Extensive repairs are also needed by the city-hall.

GLOUCESTER, N. J. — It is announced that Whitney Brothers, glass manufacturers at Glassboro, have purchased 150 acres of land on Big Lumber Creek, near Gloucester, and contemplate moving their works to that place in the event of Congress taking favorable action on the tariff.

GOVANSTOWN, MD. — Mrs. M. C. Brown is building an addition to her residence, to cost $1,400; G. Blake, builder; J. A. & W. T. Wilson, architects.

HARRISBURG, PA. — The Philadelphia Asphalt Block Company was chartered at the State Department, January 6. The capital is $100,000, and William B. Mann is President.

JOLIET, ILL. — The cost of the new elevator-building of the Joliet Elevator Co. will be $225,000.

KEENE, N. H. — The Pargetized Can Company of Charlestown propose to build a factory at Keene.

KNOXVILLE, TENN. — The East Tennessee Valley Zinc Company, organized a short time ago with a capital of $300,000, has just let contracts for the erection of the furnaces and buildings in this city.

LE MARS, IO. — Warren & Sammis are to build an opera-house; cost, $30,000.

MIDDLEBORO, MASS. — There is talk of erecting a paper and pulp mill on the Muttock privilege, so-called.

MINNEAPOLIS, MINN. — Col. Wood contemplates the enlargement of his opera-house in the spring, by building it out to the street front and adding another story, which will give it a seating capacity of 2,100.

MILWAUKEE, WIS. — The Chicago, Milwaukee and St. Paul R. R. Co. is to build at the corner of Second and Fowler Sts., a freight-house; cost, $50,000.

MOUNT CLEMENS, MICH. — N. J. Gibbs is preparing plans for a frame residence, to cost about $3,000, to be built by Geo. W. Fletcher.

NEWARK, N. J. — A new opera-house is to be built on the property running through from Bank to Academy St., near Broad St.

ORANGE, N. J. — For Mr. J. C. Ogden, Jr., a residence, to cost about $15,000, is to be built from designs of Mr. H. R. Marshall, of New York.

PROVIDENCE, R. I. — There was about $1,099,316 laid out on new buildings at Providence in 1882. Pawtucket expended over $500,000, of which $340,000 was for business purposes.

Over $190,000 of the Catholic cathedral fund has been spent since the work was taken under contract. The work to be done in 1883 calls for $56,295.

RAVENSWOOD, ILL. — All Saints' Episcopal Society is to build a brick and stone church, at a cost of $7,000.

READING, PA. — The city is to build a brick fire-engine-house, cost, $7,000, from plans by W. A. Frink.

SPRING LAKE, N. J. — R. N. Carson, of Philadelphia, will build a cottage, to be frame and tile; to cost about $7,000; also carriage-house and stable to cost about $1,200; Hazlehurst & Huckel, architects, Philadelphia, Pa.

ST. PAUL, MINN. — A $15,000 house is to be built for Mr. C. P. Noyes; designs are now being prepared by Mr. H. R. Marshall, of New York.

TOLEDO, O. — The Union Elevator Co. is to spend $225,000 on a new elevator-building.

WASHINGTON, D. C. — Supervising Architect J. G. Hill has completed the plans for the proposed fire-proof Record Building, to be erected in this city, which will be submitted to Congress by Secretary Folger. If the present plans are adopted, the building will have a length almost equal to that of the Capitol. It will be five stories on each end, with a six-st'y centre, surmounted by a high cupola.

WESTFIELD, MASS. — Contractors are now making estimates for a three-st'y brick building, 85' x 125', for the Palmer Wire Company, which will be erected at an early day.

PROPOSALS.

LOCK.

[On the Great Kanawha River, W. Va.]

U. S. ENGINEER OFFICE,
CHARLESTON, KANAWHA CO., W. VA.,
December, 10, 1882.

Proposals for building lock No. 2, of the Great Kanawha River, will be received **until noon of January 31, 1883,** and opened immediately thereafter.

Blank forms and specifications can be had upon application at this office. E. H. RUFFNER,

370 Captain of Engineers.

COURT-HOUSE.

[At Charlotte, Mich.]

In consequence of the destruction of the plans for Eaton County Court-House, by the burning of the architect's office in Hall Block, Toledo, O., the date of the letting of the contracts is postponed to January 24, 1883. D. W. GIBBS & CO.,

Architects.

PROPOSALS.

PILES AND STONE.

[At St. Louis, Mo.]

U. S. ENGINEER OFFICE, 404 MARKET ST.,
ST. LOUIS, MO., December 15, 1882.

Sealed proposals, in duplicate, will be received at this office **until 12 o'clock, M., on January 15, 1883,** for furnishing and delivering 10,000 cottonwood piles and 25,000 cubic yards rip-rap, for improvement of the Mississippi River below St. Louis.

For blank forms for proposals and all necessary information apply to O. H. ERNST,

368 Major of Engineers.

DIKE.

[At New Haven Harbor, Conn.]

U. S. ENGINEER OFFICE,
NEW LONDON, CONN., Dec. 23, 1882.

Sealed proposals, in triplicate, will be received at this office **until 11 o'clock A. M. on the 23d day of January, 1883,** for constructing a dike in New Haven Harbor, Conn., to be built partly of rip-rap stone, partly of piles and stone.

Specifications and blank forms for proposals and for guaranty will be sent on application to this office.

J. W. BARLOW,

370 Major of Engineers.

WATER-MAINS, ETC.

[At Wakefield, Mass.]

WAKEFIELD, MASS., January 10, 1883.

Sealed proposals for furnishing water-pipes, water-gates and fire-hydrants, and for laying and setting the same will be received by the Quannapowitt Water Company, of Wakefield, Mass., **until noon of Wednesday, January 24, 1883.**

Specifications and blanks will be furnished to bidders only on application to the engineer.

The right to reject any or all proposals is reserved.

CYRUS WAKEFIELD, President,

369 PERCY M. BLAKE, Engineer.

HOT-WATER HEATING-APPARATUS.

[At Charleston, W. Va.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., December 30, 1882.

Sealed proposals will be received at this office **until 12 M., on the 23d day of January, 1883,** for furnishing and fixing in place complete, in the court-house and post-office building at Charleston, W. Va., a low-temperature hot-water heating-apparatus, in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent. JAS. G. HILL,

368 Supervising Architect.

FIRE-ENGINE HOUSE.

[At Providence, R. I.]

OFFICE OF THE SUPT. OF PUBLIC BUILDINGS,
CITY HALL, PROVIDENCE, Dec. 28, 1882.

Sealed proposals, addressed to the undersigned, for the construction of a building, to be erected upon the lot owned by the city, fronting on North Main and Mill Streets, to be used as a fire station and ward room, will be received at the office of the Superintendent of Public Buildings, City Hall, **until 12 M., Friday, January 19th, 1883.**

Plans and specifications may be seen and information obtained at the office of Wm. R. Walker & Son, architects, No 27 Custom House Street.

The right will be reserved to reject any or all bids for the work. JAMES McNALLY,

369 Chairman Committee on City Property.

SCHOOL-HOUSE.

[At Home City, O.]

Sealed proposals will be received by the Board of Education of the Delhi Station School District No. 6, **until Monday. February 5, 12 o'clock,** M., for the materials and labor required for building an eight-room school-house in Home City, Hamilton County, O., according to plans and specifications on file at the office of S. Hannaford, architect, Room 18, Palace Hotel Building, Cincinnati, and at the office of Dr. John Campbell, Home City.

Bids must be on blank forms, to be obtained at either office.

Each bid must contain the name of every person interested therein, accompanied by a sufficient guaranty by some disinterested person in a penalty equal to the amount of the bid, that if the bid is accepted the contract will be entered into, and the performance of it properly secured.

All bids must be addressed to R. H. Gibson, Clerk of the Board, at Delhi, O., or 174 Elm St., Cincinnati, O.

The right is reserved to reject any or all bids.

By order of the Board of Education.

370 R. H. GIBSON, Clerk.

TOWN-HALL. **[At Madisonville, O.]**

Sealed proposals will be received by the clerk of the village of Madisonville, Hamilton County, O., **until 12 o'clock at noon of January 20, 1883,** for the furnishing of materials and doing the necessary work in the erection of a town-hall in the said village of Madisonville, according to plans and specifications furnished by Samuel Hannaford, architect, and which for the convenience of bidders will be on file until January 6, 1883, at the Council Chamber in Madisonville, and after that until noon of January 20, 1883, at the office of Samuel Hannaford, architect, Room 18, fourth floor, Palace Hotel Building, Cincinnati.

Bids must be made for the work separately, to wit: Mason's work, including excavations and grading; carpenter's work; plumbing and gas-fitting; painting and glazing; roofing, including galvanized-iron and tin work; iron-work and cut-stone work.

The bids may be for either work or material, or for both; if for both, each must be separately stated, with the price.

The county reserves the right of rejecting any or all of the bids.

Each bid to be accompanied by two sureties. Bidders to use the printed forms in the hands of clerk, as no other will be received. 368

By order of Council. J. ED. JULIEN, Clerk.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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OUR competition of designs for a three-thousand-dollar house, which closed last Saturday, proves to have been a remarkably successful one, and a very large number of drawings, with the accompanying specifications, bills of quantities and estimates, in due order, have been received. Among so many, it is only fair to presume that a considerable portion will possess features of interest to our readers, and we shall reserve a much larger space in our issues of the next few weeks for the publication of the best designs and specifications than we have hitherto ventured to devote to these competitions, trusting that the general importance of the subject, as well as the unusual merit of many of the drawings, will serve to excuse any temporary monotony in the character of our illustrations. The award of the prizes will be made in due time by the jury already announced, but we shall not wait for that before selecting for publication such designs as may seem to us suitable.

IN providing with such liberal hand for the pleasure of those who take an interest in the subject of small houses, we wish to remind our readers, in fairness to the authors of the plans presented in our illustrations, that the interest which they excite ought not to go so far as to lead any one to appropriate any to his own uses without due recognition of the rights of those to whose skill they owe their attraction. For the greater benefit of the young men who compete for our prizes, as well as of the larger number who study with eagerness the work of their more energetic fellows, we required in the present competition a very complete set of drawings and documents, with the idea of directing the attention of the less experienced contestants particularly to these necessary, though unattractive details of practice, and we should be very sorry if the consequent completeness of the designs should tempt any one to borrow them for execution without asking leave. If, as we imagine will be the case in more than one instance, persons desiring to build should find among the plans some which just fulfil their wishes, we can, upon request, put them at once in communication with the authors, and predict that any corrrespondence so opened will prove a source of mutual satisfaction and profit.

THE sculptor, Clark Mills, who has enjoyed a reputation second in its way to none among the profession in America, died recently in Washington, where most of his later life has been spent. The history of his career is a singular one, and although hardly that of a great artist, at least gives a high idea of his courage and ambition. He was born in the interior of New York State in 1815, and losing both his parents while very young was taken in charge by relatives and apprenticed to a mill-wright. He soon forsook this trade for that of a plasterer, which he practised for several years, mostly at the South, first in New Orleans, and then in Charleston. Like many workmen who have risen to distinction in other professions, he devoted his leisure time to unassisted study of sculpture, modelling for himself such things as he fancied. Such study is apt to engender an inordinate vanity in the student, too ignorant to understand the superiority of the work of better-trained men, and Mills seems to have had something of it, for without other preparation than his own aimless essays, he undertook to execute a bust of John C. Calhoun in marble. His first attempt only excited laughter, but, more determined and persevering than most men, he made another, which was considered sufficiently good to be purchased for the city of Charleston, the sculptor being also rewarded with a medal for his success. After this he found steady employment in modelling portraits of local celebrities, and gaining many friends, a subscription was raised to send him to Europe for study. On his way to embark, he spent a few days in Washington, visiting the museums and public buildings, and while there was asked to make a design for an equestrian statue of General Jackson, which it was proposed to erect in Lafayette Square. Mills had never seen an equestrian statue, but, like a true American, convinced that he could make one if he only tried, he abandoned his voyage, and returning to Charleston set himself at work upon his model, which was submitted at the appointed time, and immediately adopted and carried into execution. The statue as erected is familiar to every school-boy from the pictures of it which adorn his geographies and histories, and although it has a certain grotesque air, the whole figure, weighing fifteen tons, being balanced on the hind feet of the horse by an ingenious disposition of the forelegs and tail, is by no means the worst statue in Washington. Soon after this he was commissioned to carry out a design for a still more important work, the equestrian statue of Washington, in the so-called Washington Circle, far out on Pennsylvania Avenue. This, while an animated and interesting design, is much more refined than the Jackson figure, and forms one of the most agreeable objects in a city not renowned for its artistic triumphs. Mills's last important work was the execution, from Crawford's model, of the great statue of Liberty on the top of the Capitol. How much of the design is Crawford's, and how much Mills's, it might not be easy to say, but as completed, the figure meets with very considerable success the requirements of its trying position.

PARTICULARS of the burning of the Newhall House at Milwaukee, in which nearly a hundred persons lost their lives, serve only to confirm the popular impression as to the unfitness of the building for the uses to which it was put. With even the greatest anxiety to avoid unjust condemnation of a construction which may have been no worse than many others, the simple fact remains, that a hotel six stories high, which is completely destroyed in forty-five minutes from the first breaking out of the fire, never can have been fit for occupancy as a public-house. We know that scores of seaside and country hotels are in a condition even worse, if possible, but these are beyond the pale of building-laws, and persons who choose to stay in them know that they do so at the risk of their lives. City public-houses, on the contrary, are assumed to be subject to some sort of supervision, and it is quite time that this belief should be justified.

THE coroner's jury which investigated the Calender-Street fire in Providence, at which several persons lost their lives, has concluded its long and faithful inquiry, completing its labors by a few wise recommendations for legislative and municipal action, which we trust will be complied with before their occasion is forgotten. One of the first of these advises that the use of naphtha stoves should be totally prohibited, and that stringent regulations should be enforced in regard to the storage and use of the light hydrocarbons. Another, the best of all, points out the necessity for placing the inspection of buildings in the hands of some person unencumbered with other duties, and absolutely free to enforce to the letter the provisions of the law in regard to building and the maintenance of fire-escapes. It is much to be hoped that the warning will be heard, and that the city and State may be provided henceforth, not only with judicious and explicit laws, which are easily obtained, but with what no city has yet secured, a thorough and efficient mode of executing them.

A CORRESPONDENT of the *Chicago Tribune* makes a suggestion which is worth considering, although the principles which it involves are far from being such as should govern the construction of new buildings. Observing, as every

one has, that the elevator-shafts in manufacturing or mercantile buildings serve in conflagrations to carry the fire rapidly through the building, he asks why the natural tendency of the smoke and heated air to seek the elevator-shaft might not be utilized by extending the shaft as a fire-proof chimney through the roof, with a glass skylight over it, or some other device which will open automatically in case of fire, thus creating a powerful exhaust current which will retain the flames in the shaft instead of allowing them to burst out at every story, as they do where there is no vent at the top. Such an arrangement as this would have the further advantage of establishing a definite course for a fire originating anywhere in the building, which would enable the firemen to follow and extinguish it with far greater certainty than in buildings where the opening of a window or some other trifling circumstance may draw the course of a conflagration, hidden by its own smoke, in various directions about the different stories. Of course, the best way of all would be to have the elevator-shaft securely closed, so that fire could not reach it from any room, still less ascend through it to rooms above, and if such construction were joined to simple and solid floors and ceilings it would be possible to retain an incipient fire within the story in which it originated long enough to admit of extinguishing it there; but it will be years before such planning becomes general, and any palliative for the present bad habits of construction is to be welcomed.

A NOVEL scheme is proposed by some persons in New York, who have formed a company for the purpose of constructing an underground roadway under the City Hall Park, from the west side of Broadway, near Murray Street, to the east side of Park Row, near the passage-way leading to the Brooklyn bridge. No vehicles are to pass through this subterranean avenue, but it is to be used entirely for the convenience of foot-passengers who may desire to cross the Park without running the gauntlet among the carriages and omnibuses of Broadway, and the street-cars of Park Row. The use of it is to be given to the public free of charge, but the company proposes to reimburse itself by constructing and renting stores on each side of the passage, lighted by means of a roof of iron and glass. The whole cost of construction is estimated at five hundred thousand dollars. There may be some question whether such an arcade will not interfere with the tunnel railways, one of which is laid out through Broadway and the other through Park Row, but it is probable that the latter are far enough below the surface to pass altogether beneath the arcade.

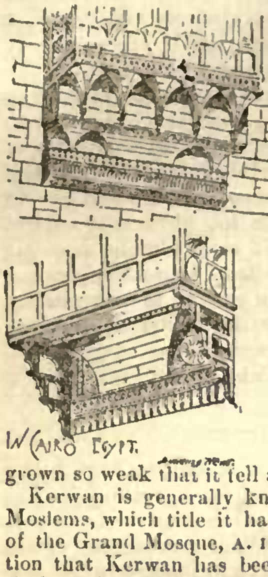
A BILL is now before Congress providing for the erection of monuments upon the battle-fields of the Revolution, which authorizes an appropriation from the Treasury of five thousand dollars towards the cost of a monument on any of these battle-fields, provided the people of the locality shall have already contributed five thousand dollars for the same purpose. If the bill is passed, there can be no doubt that its provisions will be taken advantage of to provide suitable memorials upon nearly every one of these historic spots, and it is much to be desired that they may be as artistic in form as they will be honorable in their associations. Within a year or two there have been signs that in such matters this country is about to emancipate itself from the conventional models, and no better opportunity could be found than an extensive national movement of this kind for the development of a truly interesting form of art.

THE ordinance for the registration of plumbers in Boston was passed by the City Government some weeks ago, but inadvertently repealed soon after in connection with another matter, so that the various items of the bill have come again under discussion, but will undoubtedly be reënacted about in their present shape. It is a little singular, considering the common complaint of the carelessness of architects in regard to such details, that from the first the architects of the city have interested themselves in the proposed regulations, and a committee of them has acted with the committee chosen by the plumbers in revising the text of the bill for submission to the City Government. The rules, although less detailed than those adopted in New York, are stringent as far as they go, and if well enforced will do much to restore the reputation of a city which is known as containing some of the worst, as well as the best plumbing-work in the country. It is important in drawing up such laws not to depart much from the accepted practice of the best workmen, and the authors both of the New York and Boston codes have wisely kept this fact in mind; but we cannot help hoping that in the next city which adopts a plumbing law the use of double-thick soil-pipe will be made obligatory under all circumstances. In view of the results obtained by Colonel Waring and Mr. Gerhard, with the hydrostatic test, which show that it is next to impossible to make a tight caulked joint in single-thick pipe, the necessity for employing pipe strong enough to resist the strain of proper caulking without splitting the hubs is too obvious to require comment; but even architects, and still more plumbers, shrink from the greatly increased expense of double-thick piping, and until some community shall show nerve enough to make its use imperative, such house-owners as are not under the care of pretty resolute architects or other professional advisers will content themselves with work which cannot possibly be durable.

THE stockholders of the Keely Motor Company have now a prospect of seeing their money used for something besides the fast horses which their principal is said to have purchased with the funds in his hands. What has become of the original machine we do not know, but the locomotive which was to be built on the same principle is in the course of rapid construction. According to the *Commercial Advertiser*, all the larger castings have already been delivered. The heaviest of these is the bed-plate, which measures twelve by six feet, and weighs forty-four hundred pounds. Next to the bed-plate are the two "pulley-blocks," which weigh three thousand pounds each; and the third heavy piece is the shaft, which is of steel, nine inches in diameter, and over ten feet in length. Just how a locomotive with a shaft ten feet long and two three-thousand-pound pulley-blocks is intended to work we confess ourselves unable to comprehend, but the account goes on to say that "as there is no cylinder or connecting-rods set at different angles there will be no rocking such as exists on the present locomotive;" and further, that "this engine has no dead centres, no exhaust, no heat, no cinders, and as claimed by Mr. Keely, no expense for running." The last extraordinary and important circumstance seems to be explained by the assertion that "the movement is rotary." As soon as the locomotive is completed, it is to be tried upon the Pennsylvania Railroad.

PHILADELPHIA seems to have carried away the palm, even from Jersey City, in the matter of foul drinking-water, to judge from the description of some recent occurrences. For several weeks a taste more than ordinarily nauseous has been detected in the Schuylkill water as supplied to the houses, and various theories have been advanced to account for it, but none seemed just to suit the circumstances, and the citizens generally contented themselves with filtering out the insoluble components of the mixture, and drinking the rest. After a time, however, according to a correspondent of the *Public Ledger*, a boy of an investigating turn of mind seems to have taken it into his head to venture out on the ice which covered the river, for the purpose of making some experiments. The correspondent writes that this youth "was seen to cut a hole in the ice with his pen-knife, and then to cover the hole with his finger for a short time. He then lighted a match, and removing his finger applied the match to the opening in the ice, when a bright flame about a foot high shot up and continued to burn for some time." On receipt of this communication a reporter was sent from the *Public Ledger* office to repeat the experiment, but proved unable to obtain similar results. However, he found two boys who said that the evening before they had seen a young man on the ice, boring holes and "producing any quantity of bright flames a foot high," and was forced to conclude that the water had lost a part of its spirituous quality before his visit. Not being able to set it on fire, he contented himself with tasting it and found it "offensive," and "strongly impregnated with coal-oil," accounting for this by the assertion that the water-company was drawing its supply from certain remote reservoirs, which received also the "refuse of coal-oil refineries." On the whole, the water of the Passaic, with its compound flavor of petroleum, carbolic acid, sewage and arsenic, must perhaps be acknowledged to possess still the higher bouquet, but for real strength the combustible Schuylkill water surpasses any which we ever knew to be used as a public supply.

KERWAN.



IN the centre of the Regency of Tunis, thirty-six miles from the sea, on a vast rolling plain, lies Kerwan, a city that has played an important part in the history of the civilized world, but since its glorious epoch has gradually fallen into decay and become almost forgotten. It was founded in the year A. H. 50 [A. D. 672], by Caliph Okba ibn Nafi, who conquered the country and built the city as a military stronghold. By degrees it grew powerful, and sent out armies that conquered Spain, which it held for five and one-half centuries; conquered Malta, Sicily and Southern Italy; then it gradually declined, lost one by one its conquered provinces, had several dynasties of caliphs, who held the country till A. H. 817 [A. D. 1439], when by internal dissensions it had grown so weak that it fell an easy prey to the Bey of Tunis.

Kerwan is generally known as the Holy City of Africa by the Moslems, which title it has probably had only since the restoration of the Grand Mosque, A. H. 402 [A. D. 1024]. The universal tradition that Kerwan has been a holy city from its foundation is entirely without proof. Jewish and Greek tombs have diligently been searched for by scientists to prove the contrary, but without success, and it has long been the centre of religious fanaticism and bigotry in North Africa. Before the French occupation it was inhabited by Mohammedans only. Pilgrimages were made hither by the Faithful, while Jews were not permitted to approach nearer than two miles from the city walls. The few foreigners that ever visited Kerwan entered the city under the special permission and protection of the Bey or prime minister. The mosques and sanctuaries being religiously closed to them, their stay was limited to a few days only. At present, however, since the entrance of the French, the doors have been thrown open to the light of the civilized world, showing some of the finest specimens of Moorish architecture existing. One of the principal features of Kerwan is the vast quantity of marble columns the city contains, which must amount to several thousands and are to be seen everywhere: to support the roofs of all structures of any size; on the corners of houses, to keep the brick from being knocked off; in courts; in olive-mills, to crush olives; — no house is complete without them. They are to be seen to the greatest advantage in the Grand Mosque, which contains six hundred and eleven, which are the finest and largest of them all. The vicinity abounded in Roman ruins, of which scarcely a vestige remains. There are a great number of mosques in the city, of which only a few are worthy of inspection; the majority are simply prayer-rooms, having a door opening directly on the street; some have a small vestibule for ablution before entering the mosque. The prayer-rooms generally have arched ceilings supported by columns. These small mosques are usually open only at the prayers at and after sunset; few have minarets. The Grand Mosque is the principal monument of the city. It is situated in the north-west corner, on the highest point of ground in the city, and from the minaret a clear, uninterrupted view may be had in all directions. The enclosure of the mosque is a vast quadrangle, which may be divided into two parts, the prayer-room and court; this is surrounded by a high wall, which, with its massive buttresses, has somewhat the appearance of the walls of a city or fort from the exterior. There are eight doors for entrance, three on the north side, four on the south, and one on the east end. Midway in the wall of the west end is the solid and imposing minaret. The prayer-room occupies a little over a third of the entire space enclosed. The interior measures one hundred and twenty-five feet by two hundred and fifty-six feet long. It has a slightly inclined flat roof, supported by one hundred and ninety-four columns. The prayer-room, to facilitate description, may be divided into a central nave, with a dome at each end and eight aisles on each side; the nave being larger than the aisles, having larger columns, and not being crossed by arches. The columns of the aisles are set at regular distances from each other and support horse-shoe arches crossing at right angles. The columns of the nave are double; in the centre triple; and at each end, to support the domes, five are clumped together on each side. Above the columns is a row of arches on each side, above which is cut ornament in plaster, and the ceiling chandelier-pieces are of the same. The prayer-chamber is separated from the court by seventeen sets of doors. Those at the ends of the aisles are double, made of painted wood, each of an original design: those at the end of the nave are quadruple, larger than those of the aisles, and are beautifully carved with delicate arabesques. The small door on the east end is the private entrance of the Bash Mufti, or high priest. It first opens on a small court, thence through a small passage having on each side a pair of fine old sculptured and perforated wooden doors, opening on a library and a closet for manuscripts. At the end of the passage is a small door, opening on the prayer-room, encased by three pieces of Roman frieze, with heavy ornament cut in bold relief; this opens on a small private prayer-room and is separated from the large prayer-room on three sides by a sculptured and perforated partition of wood about ten feet high, around the top of which runs an inscription in ornamental Kufic, containing quotations from the Koran, exquisitely chiselled. The perforated part of the partition is a lattice-work of turned wood set close together; the whole of it is divided into panels, for the most part carved. At the east end of the nave, under the dome, is the niche of the Mihreb, the surface of which is covered with perforated filigree work, very gaudily painted. Above the niche the wall is covered alternately with tiles and painted work in squares. The tiles are old Rhodian, and take a reflection of gold with the light, and are each of a different design. The dome is ornamented with plaster stucco at the base, partially painted green and red, and a number of ostrich eggs and Mecca stones are suspended from it by small chains. At the left of the niche is a large slab of white marble, with an ornament cut in and painted red and yellow. In one corner is a round inscription in Kufic, signifying "There is no God but God, and Mohammed is His prophet." To the right of the niche is the mimbar or pulpit, consisting of a flight of twelve steps running up to a square top: the sides and balustrade are divided into small panels of carved olive, each of a different design of great richness and beauty. In the nave are four chandeliers, and in the centre of each alternate aisle is a smaller one. These chandeliers are of bronze, of very simple construction, and made to support myriads of small oil-lamps. They are small, round-bottomed glasses, half-filled with olive-oil and water, and have a wick floating on the surface, and give a fine, mellow light. The columns are of all varieties of marble, cipollino predominating. There are two fine large ones of porphyry under the dome at the east end of the nave. Some are of verde-antique, and there are also columns of gray, rose, and black granite. The capitals are of great variety, mostly of Roman origin; some are Byzantine, Norman, and square ones with the cross of Malta that has been almost obliterated by the chisel. Capitals having ornaments of birds' heads and animals have in all cases been religiously mutilated, leaving only pieces of wings, feet and bodies to indicate what they were originally. There are seldom two capitals of the same kind, and it is rare to find a capital that belongs to the column it stands on, being often too large or too small. In many cases the top of the capitals are covered with three or four inch boards, on which to build the masonry, and the massive walls of the building keep the structure from falling. The floor is entirely covered with straw matting; also the side walls and the columns to the height of four feet. The frequent whitewashing has in many cases so heavily covered the capitals and pieces of ornament that it has almost obliterated all traces of sculpture; often the columns are half covered with whitewash. In the dome at the east end are a few small stained-glass windows; also three at each end of the prayer-room. When the mosque is closed, the little light entering gives a mystic religious feeling; but the doors are thrown open during prayer hours.

The court is a large enclosure, larger at the east than at the west end, almost surrounded by a roofed arcade broken only in the west corners by a store-room and a room for ablutions, and in the centre by the minaret. The court contains 264 columns and has two galleries running around three sides, but only one at the west end. Facing the court the columns are double, but in the galleries they are simple. The eastern façade on the court is the finest piece of architecture the building contains, and is of range masonry and cipollino columns. The columns diminish in size toward the minaret, and some of them are broken. There are Kufic and Arab inscriptions cut on some of the columns, mostly quotations from the Koran.

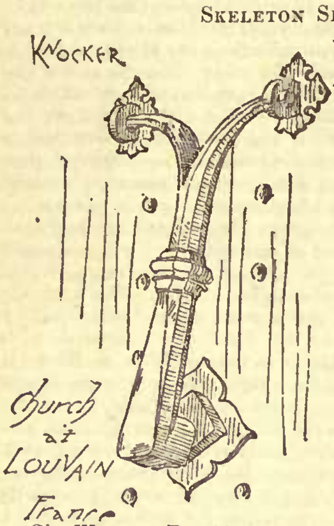
The minaret has a heavy base thirty feet square, tapering to double that height, built of stone. On this stands a hollow cube having around it a space of three feet, outside of which is a crenellated parapet four feet high. This cube has an arch on each side in which are set four columns each. At one corner outside is a small closet to contain the white and red flags. On this cube stands another of precisely the same description having the same space and parapet around and similar arches. On this is a small dome surmounted by the crescent. On the parapet the Inman stands and calls the Faithful to prayer at regular hours. The door of the minaret is encased by three pieces of frieze from Roman ruins, and to the left of it are two blocks of marble with Roman inscriptions thereon partially obliterated. A flight of 120 steps leads up to the top, up a square winding staircase with six steps at each turn, lit by a few windows and loop-holes. The court is paved in part with irregular pieces of marble, and the rest with regular paving stones, the whole sloping toward the centre where is placed a large piece of ornamented marble pierced by two holes; to the right and left toward the prayer-room are two other holes: these holes are to conduct the water to a series of underground cisterns which contain the water of winter rains for use in summer. The mouths of the cisterns are made of the bases of large columns through which a large hole is pierced: these are deeply grooved on the inside by the friction of the cords used in drawing water. The mouths are six in number. There is another cistern outside the west wall to contain the surplus water; there is also a well in the north-west corner which serves the room for ablutions. Near the centre of the court is a sun-dial with numerous points to tell the hour at any season. It stands horizontally on a cube of masonry four feet square, and is composed of four iron points in a plate of marble: there are also two others above the arcades of the east and north sides. The pavement of the north and

south galleries is raised two feet above the rest. The entrances of the court are all of the same construction. A horse-shoe arch opens on a square vestibule roofed with a small dome, and from this vestibule a large bolted wooden door opens into the court. The one entering the prayer-room from the south is of the same construction, but larger, having an outer lattice-work gate and inner double doors; this is the usual entrance to the mosque and the floor is covered with straw matting. The northern entrance to the prayer-room is the largest and finest of the entrances. It consists of a square vestibule with arches opening on three sides, containing very delicate arabesques in stucco, which are the worse for repeated whitewashing; under each arch are four marble columns. From this vestibule large double doors enter the prayer-room, above which is a slab of marble set in the wall, containing an inscription. This vestibule has a fluted dome and crenellated parapet, under which are arches cut in bas-relief in the stone. To the left of this entrance is a small zouia or sanctuary of a holy woman, built against the wall of the mosque. It consists of a small room with small dome, a door, and a window with wooden grating. It contains numerous Mecca stones which are hung from the ceiling by chains. These stones are conical in shape, two inches long by one in diameter at the base, covered with wax on which ornamental straw-work is stuck; a small leather thong is attached to the small end, and they are generally hung in clumps of five or six. The richness of the mosque consists principally in its columns, which probably represent the best part of the spoils from the Roman ruins of the Regency. The best part of the Arab work on it is the woodwork, which is original and well executed. The mosque inside and out is whitewashed, with exception of the base of the minaret and the façade facing it.

Charles X. Harris.

THE $3,000-HOUSE COMPETITION — I.

Skeleton Specification.



Excavate for cellar and trenches, and deposit material where directed on the lot.

All grading to be done by the owner. Trenches to be sunk one foot below cellar bottom.

Cellar to finish 7′ 0″ high to under side of floor joists, and cellar bottom to be graded with sand and laid in cement.

Foundations: — Foundation walls to be of good local stone 20″ thick, laid in mortar.

Cellar to have bulk-head entrance and chestnut posts for supports, resting on flat stones.

Make foundations for chimneys of good flat stones.

Cellar wall to be pointed.

Drain-Pipes: — Provide and lay 6″ drain-pipes from cellar wall, 30′ in length.

City Water: — Provide and lay pipes for city water 30 feet in length.

Brickwork: — Bricks for jambs to be good common bricks from some of the kilns near Boston. Bricks to be hard-burned, but need not be selected as to color. Outside walls to be 8″ thick, built of old hard-burned "bench" brick with round boulders built in occasionally, all laid in ½ cement mortar.

Chimneys: — Build and top out chimneys with common rough brick. All joints to be filled and thoroughly plastered outside and in.

Build into the bottom of each chimney a cast-iron door.

Provide and build into chimneys 8 sheet-iron thimbles where directed.

Fireplaces: — Build two fireplaces with pressed-brick sides, hearths, and back; tile facings to cost $10 for each fireplace.

Clothes-Boiler: — Provide and set in brick a copper boiler in laundry.

Lathing and Plaster: — All walls, ceilings and partitions in first and second stories and servant's room in attic to be lathed with good spruce laths and covered with mortar and finished with a skim coat.

Outside walls to have plaster carried down to floor.

All plaster to be of best materials and rendered true, hard and smooth.

Framing: — Building to be framed with good sound spruce of the following sizes: First floor, sills 6″ x 8″; girders, 7″ x 9″; joists, 2″ x 9″, 16″ on centres. Second floor, sill on brick wall 6″ x 8″; girt 1″ x 6″, nailed to studding; joists, 2″ x 9″, 16″ on centres. Third floor, joists 2″ x 7″, 16″ on centres, and collar 1″ x 6″ for ceiling of attic.

Studding for outside to be set 16″ on centres. Posts, 4″ x 8″; studding, 2″ x 4″; plate, 4″ x 4″.

Floors: — All floors to be bridged between bearings, and to have a lining floor of ⅞″ spruce, and all floors except Kitchen and Dining-room to be laid with ⅞″ spruce floor boards of narrow widths.

Kitchen and Dining-room to be laid with rift-grain southern hard-pine not over 4″ wide.

Veranda floors to be laid with southern hard-pine 4″ wide, 1⅛″ thick, with space between each board.

Exterior Enclosing: — All walls not of brick to be boarded with spruce boards planed to a thickness, and covered, as shown, with best cedar shingles, part to be cut in patterns as indicated.

All outside finish to be as per details of good seasoned pine, free from sap.

Building to be covered with sheathing-paper between boarding and shingles. Mitre borders around all hearths, registers and other openings.

Provide and fix hard-pine thresholds to all doors.

Balcony floor to have pine slats, laid over tin.

Roof: — Roof to have 2″ x 6″ rafters, 16″ on centres, and boarded with ⅞″ spruce boards planed to a thickness and covered with best quality sawed cedar shingles, laid 4″ to the weather. Build gutters in roofs and connect them by 2½″ galvanized-iron conductors with drain-pipe in cellar.

Tinning and Flashing: — Balcony floor to be covered with tin. Valleys to be laid close and to have pieces of zinc laid with each course of shingles.

Chimneys where joining roof to be properly flashed with lead and zinc.

Partitions, Furring, etc.: — Partitions to be made of 2″ x 4″ studding set 16″ on centres and well braced. Studs of openings to be double. Truss over all openings.

Outside brick walls to be furred with 2″ x 3″ studding 12″ on centres. All ceilings to be furred with 1″ x 2½″ strips, 16″ on centres.

Doors: — Doors to have plank frames of pine. Outer doors to be of white-pine 1¾″ thick as per details. Hardware to cost $6.00 for each door.

All inside doors to be as per details of pine 1¾″ thick. Hardware of the value of $1.50 for each door.

Windows: — Windows to be double sliding-sash 1¾″ thick, in box frames, as per details, hung with best weights and cord. Hard-pine pulley-stiles, parting-beads and stops. Stops to be put on with brass screws.

Glass to be of 1st quality German of sizes figured on drawings.

Allow $25.00 for colored glass for windows on stair-landing.

Cellar windows to have 1½″ sash, in plank frames.

Inside Finish: — All inside finish to be of white-pine as per details, that for Hall, Dining-room and Parlor to be suitable to finish in the wood, the remainder to be as good as 2d quality Michigan.

Hall and Dining-room to have chair-rail as per detail.

Hall, Dining-room and Parlor to have wood cornice and picture-moulding as per details.

Kitchen to be sheathed up three feet with pine sheathing of narrow widths with moulded cap at top.

All small doors to be fitted up with cupboard catches and all drawers to have proper pulls.

Pantry and china-closet to be fitted up with wide shelves and 4 narrow ones in each, also a set of three drawers in each.

Build coal-bins in cellar with 2″ x 3″ studding and ⅞″ spruce boards, all to be planed.

Build wooden mantels in two rooms to cost $20.00 each, and plain shelves in bedrooms to cost $3.00 each.

Stairs: — Build stairs as shown with spruce plank stringers, treads 1⅛″, risers ⅞″, and ⅞″ finish stringer, all of pine; rail, newel-posts and balusters all of cherry as per details.

Stairs to attic and cellar to have ⅞ treads and risers of pine and plain guard-rail of pine.

Build bulkhead steps of chestnut-plank, and steps to entrances of pine.

Painter's Work: — All outside wood finish to have three good coats of best lead and oil, of such tints as directed.

All inside pine finish except Hall, Dining-room, and Parlor to have one coat of shellac and two coats of paint. Rooms not painted to have two coats of shellac and one coat of varnish.

Hard-wood of stairs to be well filled with stuffing and oil, and two coats of shellac well rubbed down in oil.

All tin to have two good coats of metallic paint.

All roofs to have two coats of red paint.

Gas-Fitting: — Do all gas-piping to conform to the regulations of the local gas-company. Fixtures to be put in by the owner. Fix gong-bell on front door.

Plumbing: — Provide and fit up in Bath-room a 14-oz. planished copper bath-tub with all proper fittings, nickel-plated.

Fit up a 14″ Wedgwood bowl, and one of Helyer's water-closets, all with proper fittings, etc.; 4″ soil-pipe running to drain outside of cellar wall and carried up through roof with ventilator at top, and all to be properly trapped.

Wash-bowl to have marble top and back.

Fit up in kitchen a 36″ iron sink with compression-bibs for hot and cold water. Sink to be sheathed up underneath, and fitted with cleat doors.

Waste-pipe to sink to be trapped.

Provide and fit up in kitchen a 40-gallon copper boiler with all proper connections.

Provide copper wash-boiler for mason to set in laundry with soap-stone slab, and cast-iron door and frame, with compression-bibs for hot and cold water.

ESTIMATES OF QUANTITIES AND PRICES RULING IN THE SUBURBS OF BOSTON.

Item	Rate	Amount
100 square yards cement floor	$ .50	$50.00
190 cubic yds. excavation.	.25	47.50
50 perch of stone for foundation	2.25	112.50
14 perch of stone for underpinning	2.50	35.50
5,000 bricks for outside walls, laid	18.00	90.00
600 bricks for jambs, etc.	20.00	12.00
2,600 bricks for chimneys	20.00	52.00
400 face-bricks for fire-places	30.00	12.00
8,300 ft. rough lumber	17.00	141.10
3,000 ft. outside boarding	17.00	51 00
2,800 feet floor-lining of spruce	17.00	47.50
2,100 ft. spruce floor boards	25.00	42.50
450 ft. hard-pine floor boards	40.00	18.00
650 square yards lathing and plaster	.25	162.50
19 inside doors and one double door	2.50	55.50
2 outside doors	4.50	9.00
2 cellar doors	1.50	3.00
31 window frames, sash, etc.	4.00	130.00
32 M. shingles	4.25	136.00
Outside finish mouldings, etc.		50.00
Stairs		130.00
300 ft. pipe sheathing for kitchen and laundry		$10.50
Fittings for pantry and china-closet		30.00
Fittings for other closets		15.00
Hardware for doors and windows		50.00
Nails		25.00
Plumbing		200.00
Painting		150.00
Three mantels	20.00	60.00
Four shelves	3.00	12.00
Inside finish, casings, base, etc.		200.00
Colored glass		25.00
Gas-piping and fixtures		50.00
Tiles and brasses for three fireplaces		40.00
Setting wash-boiler		8.00
Coal-bins		10.00
30 ft. drain-pipe	.30	9.00
150 ft. galvanized iron conductors and pipe.	.20	30.00
Carpenters' labor		500.00
Allowances for waste, etc.		150.00
Builders' profit	10%	275.00
Architect's commission		200.00
Total		$3,343.20

Furnace put in by owner.

These prices were obtained from a reliable builder of Boston.

Submitted by "Danfors."

THE ARCHITECT'S GHOST.

A ROMAN TOMB
Square in plan.

THE *cause célèbre* which has occupied one of the courts of law for so many weeks past, and which has aroused almost still more interest in the world of artists and connoisseurs, can scarcely have failed to awaken here and there behind the scenes of the architectural profession a peculiar kind of uneasy feeling, if no more. Is there or is there not such a functionary as the Architect's "Ghost?"

The account which has been given of the manners and customs of the Sculptor's Ghost is not only amusing, but dramatic. You ring the door-bell. A hatchway opens in the studio floor. A listening ear is strained. You send in your card. A silent shadow glides downwards through the floor. It disappears, and the flap closes over its head. You are admitted. You find the great artist absorbed in his great work, his spirit in the empyrean. You have to pull him by the sleeve before his thoughts return to the level of the earth and of you. But he is glad to see you, nevertheless, and glad to think that you are gladdened by the inspection of his great work. After a few happy moments you take your leave, and the silence of ineffable repose settles like a pall upon the chamber of imagery. The trap is raised again. The ghost reascends. The task which you have interrupted is resumed. Roman augurs winked to each other across the altars of the gods; but there is no winking here. When Socrates and his demon walked alone together, and worked out the secrets of wisdom, this was at least more akin to the transcendental brotherhood of the studio. The fashionable sculptor and the provider of "artistic assistance" work out in secret the mysteries of English statuary, and why should the world be any the wiser?

Whether there may be a great deal of truth in this, or none at all, we do not at present care to inquire; the case is one of those which in a "commercial country" may be left to the judgment of commercial men. That is to say, when a product of even the highest art is, as a work of sculpture must always be, to the purchaser an article of trade value, it is useless for purists to pretend to shut their eyes to the fact that an occasional producer, if in any way conscious of his own deficiencies — and who is without them — may easily persuade himself to supplement his own art by that of some artist "to the trade." The question, then, which we now propose for consideration is how far anything of this kind prevails in the practice of architectural design, and to what good end or ill.

Now we need not boggle at the admission that certain classes of architectural practitioners in a large way of business (this is the appropriate phrase, however vulgar some may think it) have done their designing wholly by other hands. Neither need we hesitate to declare that we do not wholly approve of this. The architect's ghost, in the eye of many a true critic, exists only to be denounced; like Artemus Ward's Indian, he is "pison wherever found." And we are glad to think that this view of the case is coming to be more cordially accepted amongst architects every day. In other words, the principle is being more and more widely and firmly accepted that the professed architect who does his designing by another hand, not because he has no time at command, but because he has no ability, is scarcely a true man.

There are "firms," for example, who "do" architecture as they "do" rent-collecting, valuations for probate, surveys of dilapidations, compensation claims, sales by auction, and (the connecting link) the laying out of land for building. The customers of such extremely commercial "houses" are not, however, deceived in architectural matters, as the wicked say the fashionable sculptor is capable of deceiving fine ladies and gentlemen. The fact is generally pretty plainly stated that "we keep a gentleman who attends to our architectural department," and so the matter ends. There are builders also who "keep their architect," but neither in this case is he a ghost so much as a sort of substantial artisan carrying off three or four sovereigns loose in his waistcoat-pocket every Saturday at noon, and holding office subject to a week's notice on either side. The real architect's ghost is quite another kind of man. Moreover, there are two classes of architects' ghosts, the indoor and the outdoor.

Now when an architectural practitioner is falling into the sere and yellow leaf, and is no longer physically able to work all night, or even after dinner, at the drawing-board, or when, although in middle life, he is so much occupied with the business of administration that he perhaps cannot sit down to the drawing-board at all, no man of common-sense would grudge him the help which is to be obtained at the hands of an assistant of high class, who understands his manner, can interpret his hasty sketches, and has learned to identify himself with his spirit. To such a lieutenant the ablest master may be permitted to hand his memoranda and dimensions, and his rough idea, as it is called, of how to treat the subject; and although the subordinate may not be able to do all that the master might, yet it may be felt that necessity has no law in such circumstances, and that it would be but an affectation to speak of the design as the work not of the one but of the other. Cases can even be imagined in which not a single line of the roughest of rough sketches has been done with the master's own pencil, and yet the product shall be his own as honestly as if he had worked out every part of it. The test is simply this: whether he could have done it as well for himself had circumstances permitted, and the probability is that he could have done it better, and a great deal better. Indeed in architectural work this state of things may be recognized more readily than in almost any other kind of artistic work whatever; for the drawing is not in fact the design. Moreover, the design, if it be truly architectural — that is to say, constructionally rather than only superficially artistic — has in a great measure to work out itself rather than to be worked out, growing like the tree, from germ to sapling, from sapling to branch, and from branch to flower, by a natural gradation and development, in which, just as it alone works, the first inspiration contains within it the essence of all.

But the architect who employs the aid of a ghost is, as we have already hinted, the very respectable, tradesmanlike gentleman who cannot do the design himself because he never knew how, and whose time is fully occupied by choice in what is called "getting the business." He is a sort of agent or traveller for architectural work, and so far, indeed, he is the right man in the right place; for all the fault we find in him is that he does not confine his pretensions within this very useful limit of fact, but considers it necessary to profess to do that also which he knows is beyond his power.

The ghost in such a case is, as we have observed, of one of two classes. Either a high-class assistant lies *perdu* in the office, in a position which is certainly humiliating, or a designer "to the trade" is employed, whose manner is strictly his own, and whose work in many instances can be as clearly read by those who are behind the scenes as if they had seen him do it. Now both of these modes of proceeding, we are glad to acknowledge, are falling more and more into desuetude every day, and therefore, far from experiencing any desire to exaggerate the evil, we will now take leave to offer what may almost be an excuse for a practice which need no longer awaken the apprehension of those who wish well to the art.

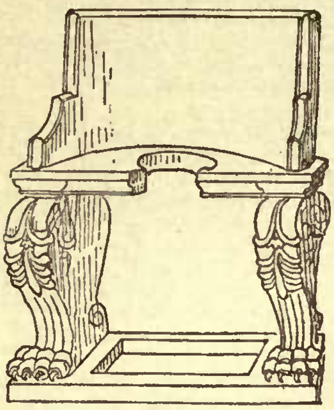
For after all, as everybody knows, what the English public want from an architect is primarily the skilful and financially successful administration of their building business in one way after another, and only very secondarily indeed the introduction of the delicate finesse of artistic design. The profession of architects, consequently, as constituted by those external influences which are necessarily the strongest, is held to consist of little else than expert building agents. In nine cases out of ten, therefore, the clients do not care a button what means are adopted *to put the polish on the plan*, as they may be supposed to say; and as for being fastidious on the point of personal authenticity and individuality, the idea cannot be got into their heads at all; as even the late Mr. Street came to know to his cost, when a churchwarden roundly told him one day that he understood a certain restoration was to be done, *not* for the sake of the architect's individuality, but for something much more intelligible.

We are not by any means afraid, therefore, of the architect's ghost. We can never cease to sympathize with that most estimable class of our highly educated younger men who are obliged to remain in the position of assistants year after year when they have long been perfectly qualified to do business for themselves, and we do not hesitate to plead their cause when they ask for more direct recognition

than they receive; but their case is one of the inevitable grievances of all business, and cannot well be helped. Nor do we fail to see the important use occasionally of the "architect to the trade," and certainly we cannot help respecting his abilities. As time wears on matters will, we hope, get better in many ways besides these, and the wise will wait.

A word more to those who are both wise and young. To get into good practice as an architect is, if the truth may be told so plainly, not so much a matter of skill in art as of aptitude for, as the bagmen say, "securing orders." It is easy enough to do the work; the difficulty is, how to get it to do. Look this fairly in the face, and many things are explained and many offenders exonerated. We must take the world as we find it. — *The Architect.*

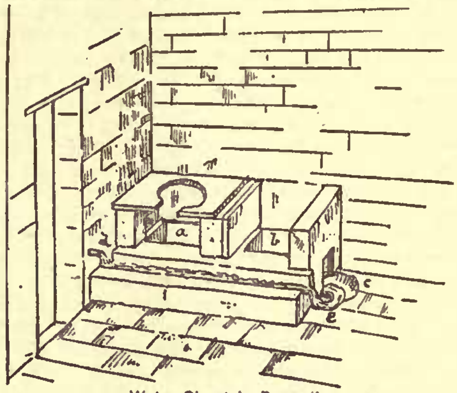
WATER CLOSETS. — III.



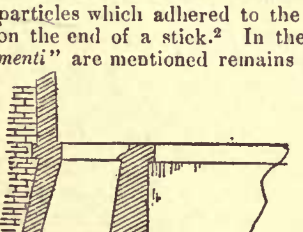
F. LIGER,[1] in his work on this subject, informs us that the remains of three privies were found in the ruins of Acteon's house, Pompeii.

One was situated against the wall on the alley, another under the steps, and the third was in the kitchen. The first was the only one that received light from the outside. Remains of privies (*latrines*) are still found in Lucretius's house, placed in a narrow closet.

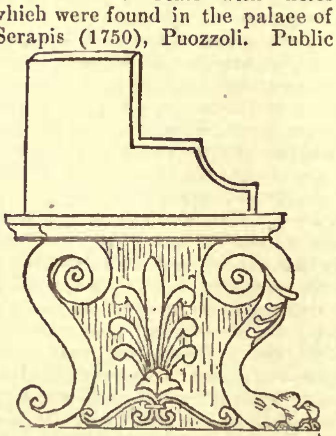
A drawing by Piranesi represents a water-closet (*sterquilinium*) from the same town. There are three compartments placed in a large chamber, one of which has a seat; the other seems intended for use after the manner of Orientals (by squatting), while the third was evidently used as a urinal. The water is admitted by a pipe which runs through the wall: thence it flows in front of the seats through a gutter, falling into the urinal from a higher level, where it turns and runs under the closet seats, carrying away fæcal and other excrementitious matter. This was probably a cleanly arrangement, when we take into consideration the fact that the Romans cleaned off all sediment or other particles which adhered to the surface with a sponge or mop fixed on the end of a stick.[2] In the work entitled "*Le Case et i Monumenti*" are mentioned remains of privies which were found in the house of Marco Lucretio. In these rooms remains or indications of tiling were found, and obscene figures pointedly drawn. Cochin and Belicard, in "*Les Antiquités d' Herculaneum,*" mention and illustrate several seats with holes which were found in the palace of Serapis (1750), Puozzoli. Public latrines among the Romans had no seats, they being in the habit of crouching, after the manner of Orientals. In private houses marble seats were usually used; but in some cases the choice of arrangements was given them, both kinds, with and without seats being placed in the same room. In Constantine's time (300 A. D.) and probably at an earlier date, seats in the shape of chairs, with backs and arms and elaborately carved legs and feet, were used for this purpose. A fine example was in the Louvre some years ago, which is supposed to have dated back to Constantine's reign.



Water-Closet in Pompeii.
a. Seat for sitting on. *b.* Place for crouching. *c.* Urinal. *d.* Water-pipe. *e.* Stream running in urinal.


Section.

Plan.
Privy from Palace of Serapis, Puozzoli.



GLENN BROWN.

[*Inscription found on a wall in a privy in Pompeii.*]

Quaeras censeo, si leges laboras
Nigri Tornicis etrium poetam
Qui carbone rudi patrique crita
Scribit carmina quae legunt cacantes.

[1] "*Fosses d'aisance Latrines Urinoirs et Vidanges.*" F. Liger, Architect.
[2] Major's *Pompeia*, Pl. xxxv.

THE ILLUSTRATIONS.

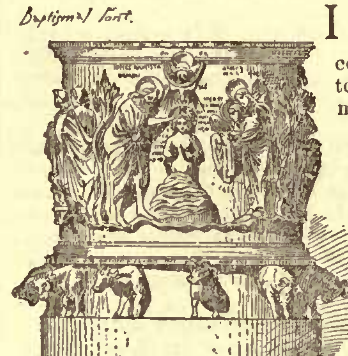
DESIGN FOR A $3,000-HOUSE, SUBMITTED IN COMPETITION BY "*Danfors.*"

OWING to the number of designs submitted and the consequent great labor of the jury in comparing them and examining the specifications and estimates, it will probably be some weeks before we are enabled to announce the result of this interesting competition. Meanwhile we shall continue the publication of the most worthy designs, — such action on our part being wholly independent of the jury and in no way prejudicing their conclusions, — so that the award and criticism, when they do come, will be more readily appreciated by our readers. As the number of designs offered is greater than usual, the number we shall publish will be correspondingly larger.

THE GRAND MOSQUE AT KERWAN, TUNIS, AFRICA, SKETCHED BY MR. C. X. HARRIS.

For description, see the article on Kerwan elsewhere in this paper.

SUNDRY WORKING-DRAWINGS.[1] — III.



I NOW propose to lead you right across England to the opposite coast of Wales, where it has fallen to my lot to carry out some of the most important works that have been entrusted to me. My first introduction to that neighborhood was in the year 1863, during which I received a commission from Mr. Thomas Savin, of Oswestry, to whom the principality of Wales owes a great part of its railway accommodation. That gentleman asked me to make a survey at Towyn, in North Wales, where he contemplated laying out for building all the land lying between two of the stations of his coast line. When that was finished he desired me to proceed to Aberystwith by a morning train, so as to be able to advise him in the evening of the same day as to some additions he proposed should be made to the building in that town known as Castle House, in order to convert it into an hotel. This was, as I found it, a large and complicated collection of buildings, of which the nucleus was a triangular structure with an octagonal tower at each corner. This central portion had been built by Nash, to whom London owes Regent Street. Having taken a rapid survey, I made a sketch design for a wing to be built southward of the above-named structure, along a narrow strip of land lying between the road and the cliff. This was intended to contain a large saloon, to serve as a dining-room, about one hundred feet long, having eight bay-windows overlooking the sea, and at the farther end of this was another octagonal tower. Mr. Savin approved this design at once, and desired me to lay out the foundations of it on the following morning, ordering some thirty men to be on the spot to receive my orders. This I accordingly did, after which I proceeded to town to complete and send down the requisite drawings. In order to provide as many bedrooms over this saloon as possible, without interfering with its area by any supports except those afforded by its external walls, I projected the outer face of the first floor to the front of the bay-windows by means of arches spanning from one bay to another, and constructed the partitions with queen-truss framing, which permitted of openings in the middle of the transverse ones for a central corridor. The longitudinal ones again rested upon these latter, and were framed likewise with openings for doorways in the middle of each of the rooms so divided off. These trussed partitions provided also the strength requisite for a flat roof over the whole, proposed to be covered with asphalte upon concrete, and to serve as a belvedere, whence any number of visitors congregated on it might enjoy the extensive coast and sea views obtainable from it.

This flat was approached by three circular staircases within turrets, from the saloon and bedroom floor and waiters' rooms. Since the conversion of the building into a college this space has been enclosed, and provides a large recreation apartment for its students.

My employer, acting as his own builder, decided to my regret to execute this wing in brickwork, to be covered with cement. This being the case, I designed the upper portion in timber-framed construction, with brick panels to be cemented and ornamented with incised work and colored so as to produce effect.

During the progress of this southern wing I one day received a

[1] Paper read at the meeting of the Architectural Association, November 24, 1882. By J. P. Seddon.

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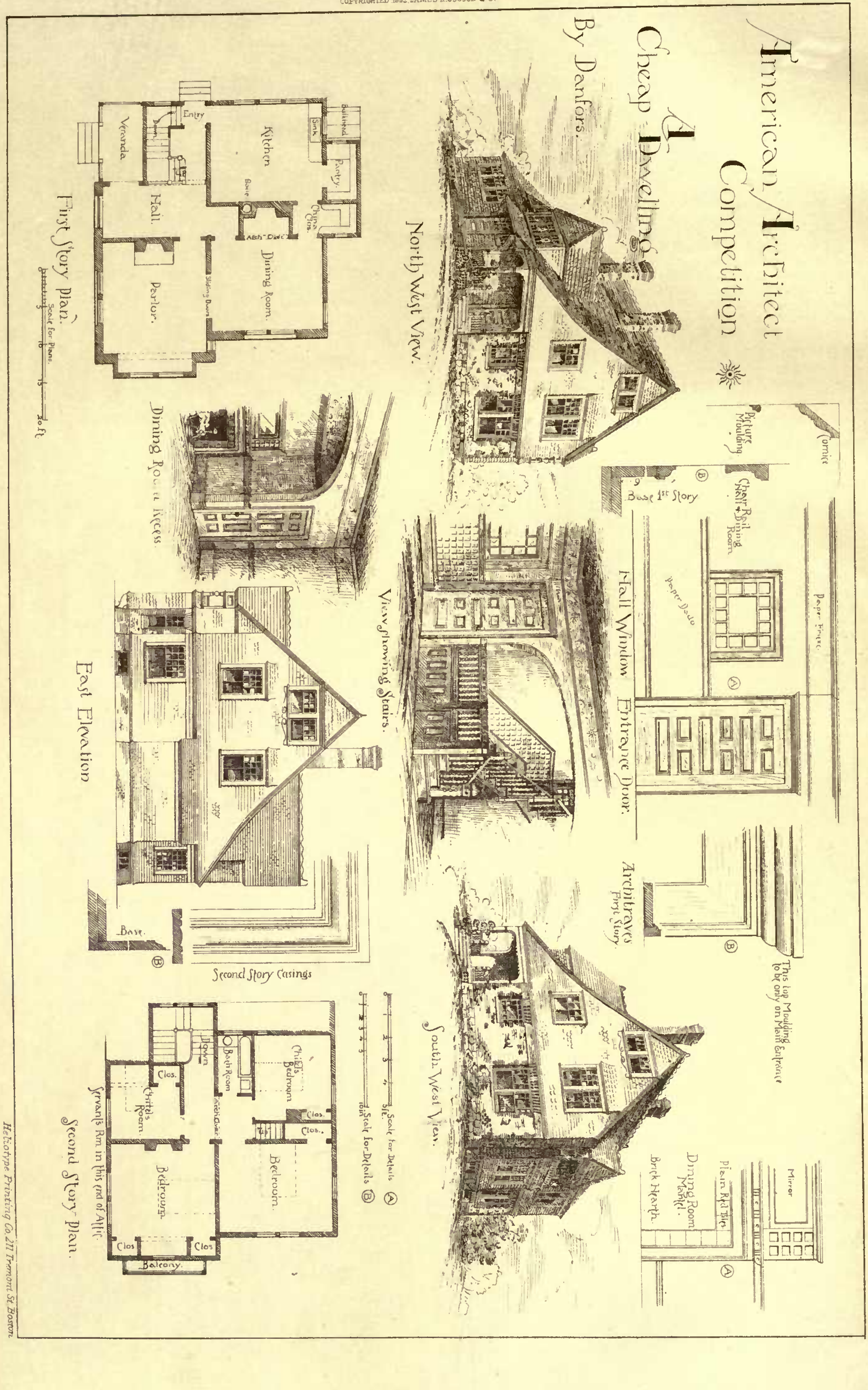
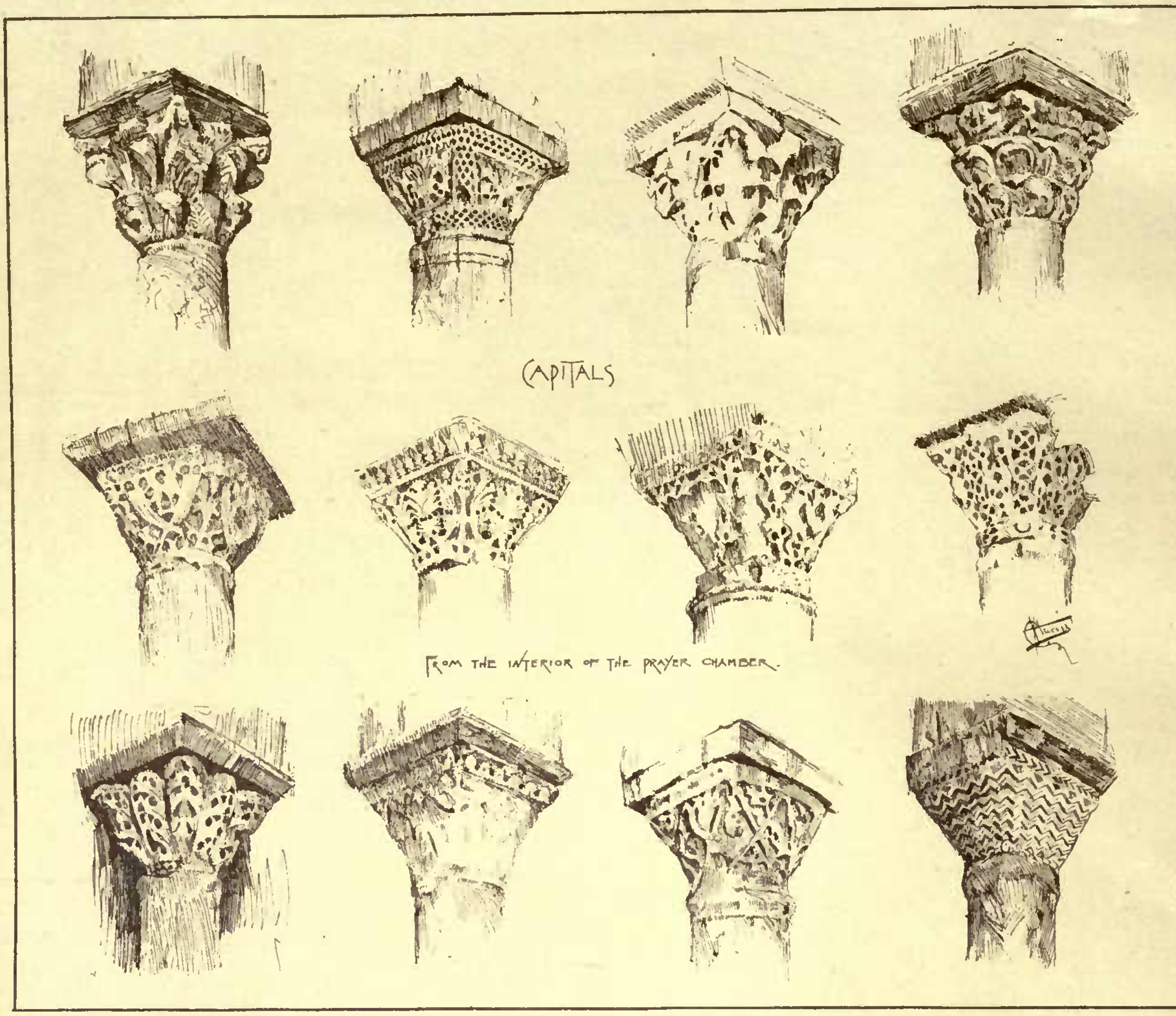
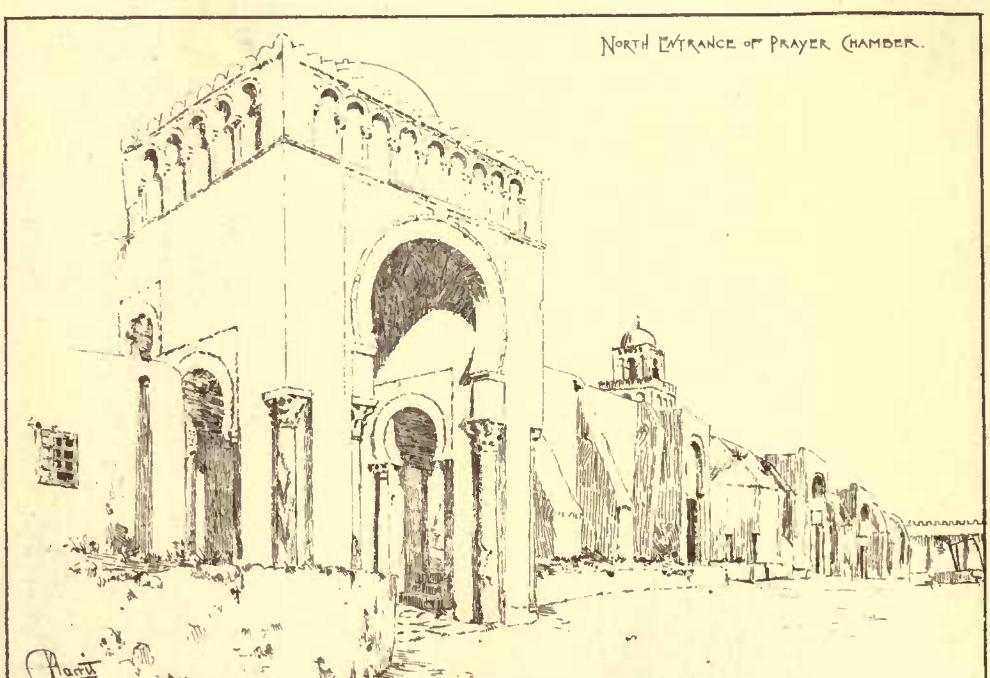
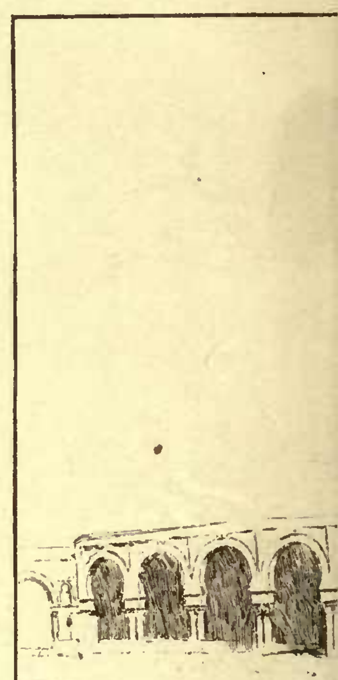



CAPITALS
FROM THE INTERIOR OF THE PRAYER CHAMBER.


NORTH ENTRANCE OF PRAYER CHAMBER.



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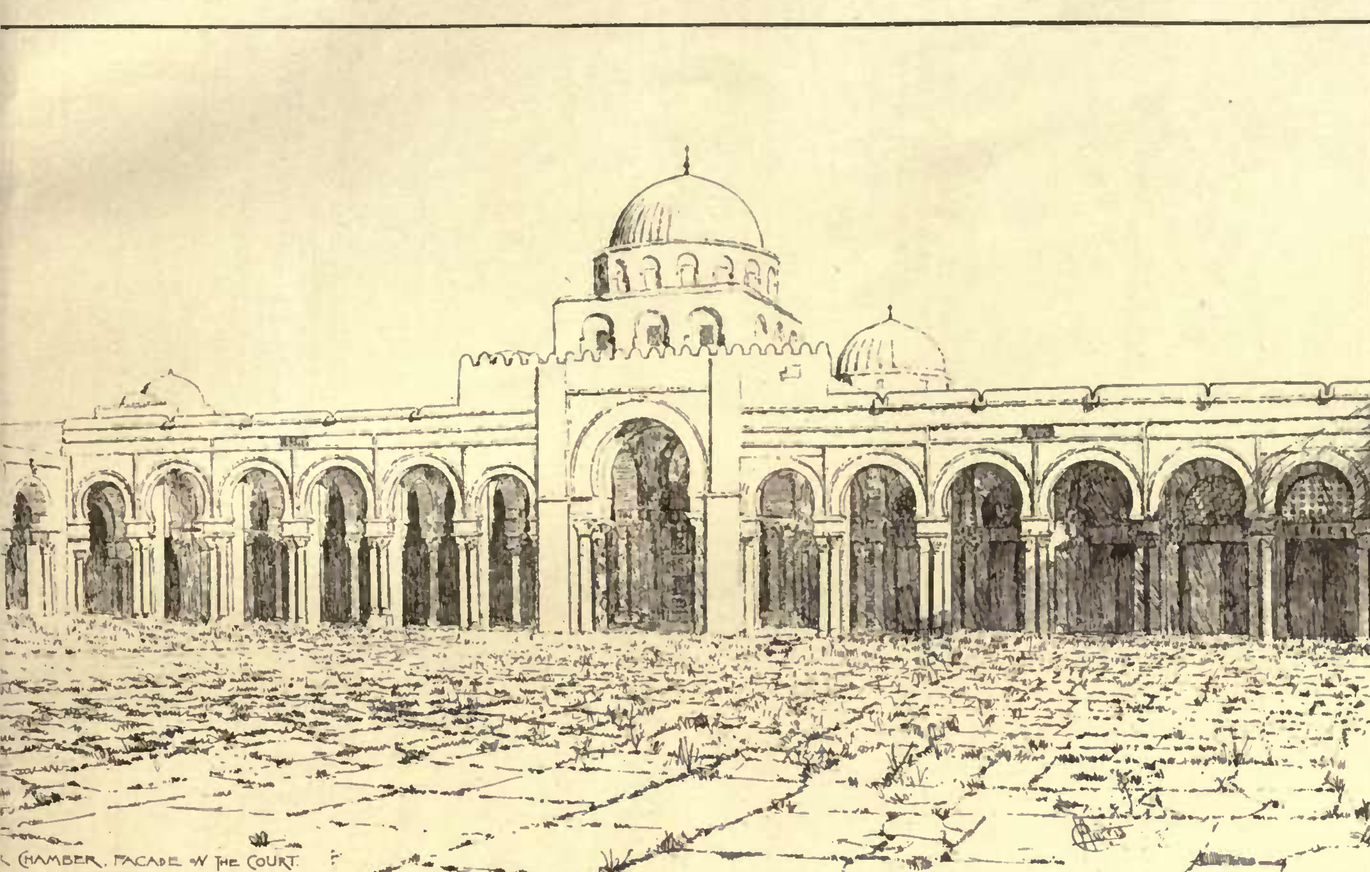

CHAMBER, FACADE ON THE COURT.

ND MOSQUE AT KERWAN
TUNIS, AFRICA.

THE MINARET, FROM THE COURT.

CLOISTERS ON SOUTH SIDE OF COURT.

Heliotype Printing Co. 211 Tremont St. Boston

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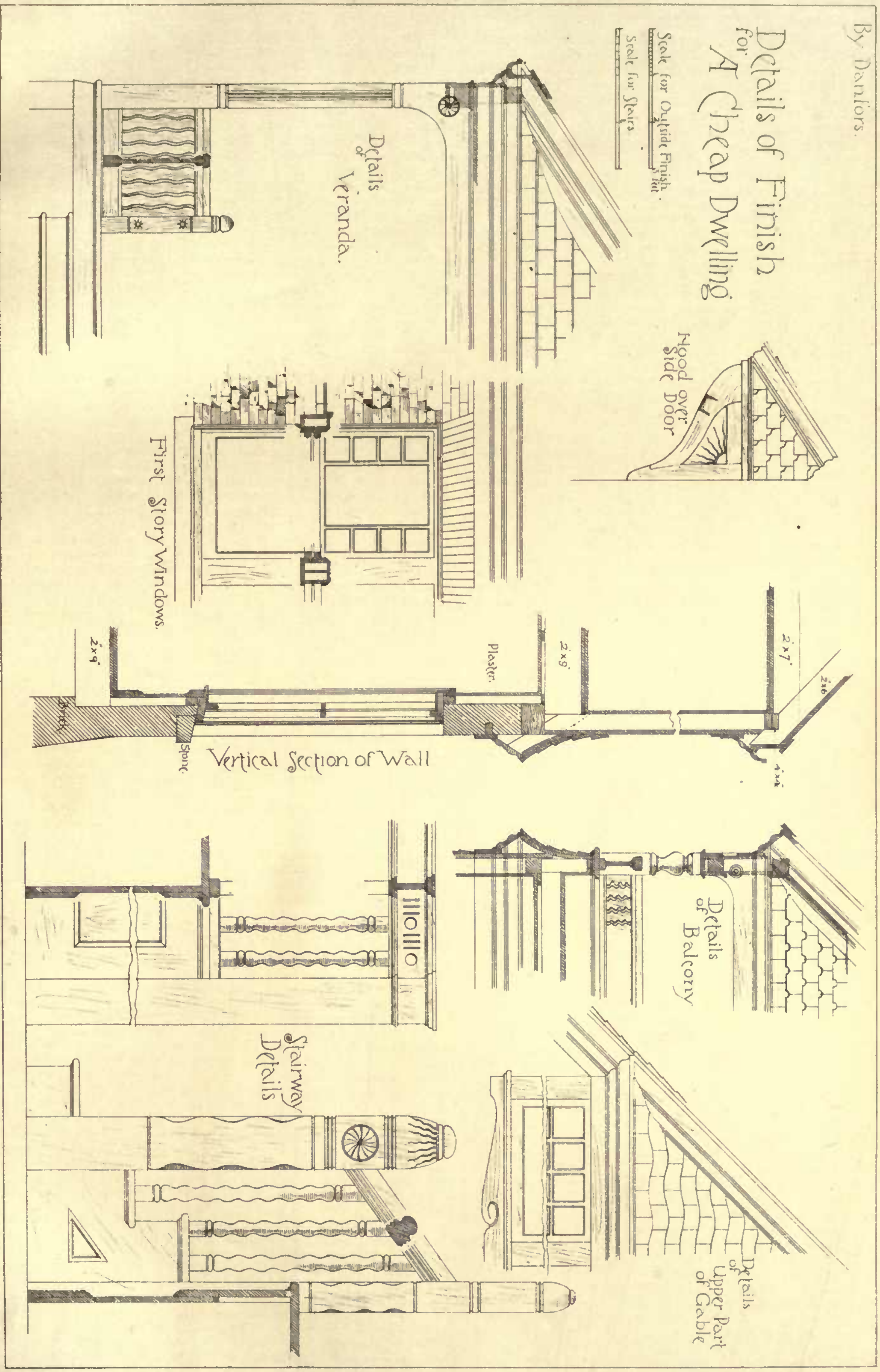


Heliotype Printing Co. 211 Tremont St. Boston

summons by telegram from Mr. Savin to go down to consult with him in the evening about the construction of another wing northward of Mr. Nash's building. I was again allowed no time for the preparation of working-drawings, but was instructed to proceed then and there to carry out my approved sketch, 500 men being told off to execute the work, the whole of whom I had to keep well employed. This time, however, I was permitted to have my own way as to material, and I consequently selected Bath stone for the dressings, relieved by blue Pennant stone from Hanam, near Bristol, for the columns, and a local cinnamon-colored stone from a quarry belonging to Mr. Savin for the wall-work. The principal entrance was arranged in the centre of the building at the back, where, there not being space sufficient for any porch of an ordinary rectangular form, I designed the triangular one, which was erected, and gave every facility required. Adjoining the entrance lobby on one side was the principal staircase within the tower, the plan of which is trefoil-shaped, next the street. On the side is a special staircase to what was intended as the billiard-room and its appurtenances. The billiard-room is of an oval form, and capable of holding three tables with bays on either side for spectators. Underneath this apartment, on the ground floor, is one which was intended as the bar, and whence the approaches to nearly all parts of the building could be commanded. The intermediate floor was required to be of great strength, so as to obviate all danger of vibration to the billiard-tables; to accomplish this purpose, being indisposed to use girders, I designed a special system of flooring, in which although the span is twenty-five feet, no piece of timber deeper than nine inches was used. The joists, nine by three, were strengthened by struts underneath, disposed in such a manner as to carry a cradling for boarding ceilings, with moulded ribs, which were, in fact, shallow vaultings in wood-work, and possessed of very great bearing power. This same method of flooring I afterwards used for several of the other large rooms in this building, as well as in a mansion at Abermaide, near Aberystwith.

For the large saloon, about eighty feet long, intended as a drawing-room, and a smaller adjoining one in this north wing, I adopted trefoiled shapes for the plans of the bays next the sea, and utilized an irregular piece of ground on one side of the former for a series of vaulted recesses, separated from the room by a stone arcade with marble columns, and at the end of the room is a segmental apse with a range of traceried circular windows in stone, to be filled with ornamental glass.

At the mansion of Abermaide, which I built shortly after this college, I adopted generally the same character of detail, and in particular I may call attention to the entrance porch, the lintels of which, of considerable span, are of Doulting stone carried on columns, the shafts of which are of polished Shap granite.

Very recently, I was requested by the directors of the North and South Wales Bank to erect for them a bank at Birkenhead, in which I was specially requested to use the same general style and character of detail as that I had employed on this college and at Aberystwith, and it was carried out accordingly.

Somewhat similar also, but with round instead of pointed arches, is the addition that I made about the same period to the mansion of Barrells Park, near Henley-in-Arden, in Warwickshire, the seat of Mr. T. H. G. Newton. This erection consists of a winter-garden conservatory; filling up a court between two wings of the mansion. Its enclosing screen-walls are built of Camden freestone, which has a deep yellow tint, and the supporting columns of the roofing, which is of timber and glass, and divided into square compartments, have shafts of Devonshire marbles, with richly-carved capitals. The whole of the flooring is of alternate dark bluish-gray and white marble squares within the moulded stone margins of the several flower-beds.

Before, however, leaving the neighborhood of Aberystwith, I may mention some particulars in connection with the restoration of the noble cruciform church of Llanbadern, which originally was a cathedral, and is situated about a mile from that town. This has been a work which has extended over a very considerable portion of my professional career. It has been carried out in successive portions, as the collection of the necessary funds has permitted. It commenced with the restoration of the nave and the rebuilding of the porch in the year 1868. The tower and transepts were restored in 1878, and the work to the chancel is now in progress.

The first portion was begun before the establishment of the Society for the Protection of Ancient Buildings, which at the second stage in the proceeding, though they did not honor me with any notice of their intention, sent a protest to the committee against the further prosecution of the work. Other antiquaries, however, of equal zeal and ability and greater courtesy, had at the very commencement interested themselves on behalf of the venerable fabric, in particular the Rev. Mr. Petit, to whom Llanbadern Church had always been dear, and who has given one of his characteristic sketches of it in his work entitled "Petit's Church Architecture."

That gentleman, anxious to learn what was proposed to be done to the structure, asked Mr. F. Penrose, the architect, to confer with me on the subject on his behalf. Recognizing at once the propriety of the feeling which had dictated this step and the courteous manner in which it was conducted, I addressed myself to furnish sufficient accurate particulars to enable a fair judgment to be formed. I directed measurements to be taken at distances of ten feet apart the whole length of the church, from lines plumbed from the base, and these showed the precise amount that the thrust of the decayed roofs had pushed the walls outward. This in fact was found to be not less than thirteen inches in a height of nineteen feet. The consequence was that Mr. Penrose intimated to me that it was obvious that the condition of the fabric was as dangerous as I had reported it to be, and that the work proposed was necessary.

I shall not weary you with any minute description of the state in which I found the church, and my working-drawings, which are to be reduced as illustrations to this paper in the journal of *The Architect*, will show what I have done to it. It will suffice to say that the walls forced out, as above described, and with perished mortar, were on the point of falling; the roofs had been much lowered, or else later debased ones had been substituted for the original: the ceiling came down below the points of the crux arches, and a huge timber cage was hung from the tower half-way down these arches to serve as a ringing stage, and the furniture of the church was rotten with the damp which the roofs had failed to exclude.

The special characteristics of this church are extreme simplicity in combination with the grandeur that results from largeness of scale, each arm and the tower being forty feet wide externally. The only place where any richness of architectural detail had been indulged in, was in the southern doorway, where the jambs were in three orders, shafted with rudely-carved capitals, and the arch was richly moulded, the details being of the characteristic Early English work of the district. All the original windows had been simple narrow lancets. These were rather curiously grouped in the west end of the nave and end of the south transept as triplets, one light, smaller than the others, being raised much higher. Those of the eastern end had been superseded, with an advantageous effect of concentrated light in that part, by a large Perpendicular window, with a smaller one of the same style on either side of the chancel. These, which are still dilapidated — the former having its mullions and tracery of wood, and the latter being blocked up with masonry — I propose to restore and reglaze. The original levels, or in some cases slopes, of the floors were sought for, and when ascertained were replaced. The floor of the nave was to slope upwards very considerably from the western end to the tower.

In the new roofs which I had to design, I adopted that character which my previous experience of Great Yarmouth had convinced me to be the best for such a span — thirty-two feet; that is, with principals and cradlings for the ceilings. The ceilings I have varied, increasing them in richness eastwards; and in that under the tower floor I have adopted wooden vaulting to support and make rigid the beams that existed before. In the same manner in the chancel, its ceiling is made to serve the same purpose for its old but rude oak roof, which it proved possible to retain. In my designs for the flooring or paving and furniture, which were all necessarily renewed, I have introduced an increasing amount of richness of detail eastward, with the view of enhancing by contrast the effect of the extreme simplicity of the architectural features of the stone structures of the church, which I have not ventured to alter in any way. I may call attention to the working-drawings of the pavement under the tower as being composed of the mosaic of Mr. Rush's manufacture, in combination with tiles executed by Mr. Godwin of Lugwardine from special designs of my own, representing subjects from the Apocalypse. In the chancel of Holmer Church near Hereford, and in some other places, I have also used this same series of tiles, but without mosaic.

The remaining drawings that I propose to lay before you on this occasion belong to works which are now in course of progress, or on the point of being commenced. Mr. Hugh Roumieu Gough is associated with me in regard to that of the important church of St. Paul's at Hammersmith, for which we are joint architects. In order to obtain the lofty proportions particularly desired by my colleague and the committee, it was necessary it should be dignified but simple and devoid of ornate detail, as the funds at our command were strictly limited. Such being the case, we have given great study to the question of the material, and have reason to think that we have been somewhat exceptionally fortunate in that respect. The stone for the exterior wall masonry is of red Mansfield, laid in horizontal courses, with the face-work hammer-dressed. This is being supplied from Mr. Robert Lindley's well-known quarries, at a price which competes favorably with that of the far colder and less pleasant-looking Kentish ragstone with which Londoners are, in our opinion, unfortunately too familiar. Then the stone for the facing of the walls internally is brown Ancaster, of a rich warm color, but beautifully varied. This is, we think, the first time that this has been used in the metropolis, although in mediæval times it was extensively used in the churches of Lincolnshire; and indeed the quarries, which also belong to Mr. Lindley, were worked by the Romans. As regards the stone-work for the dressings, we have been less fortunate; we had hoped to have had all the dressings executed in red Mansfield, but owing to the great cost of working, we have been compelled to content ourselves with Box ground stone for the exterior, and Corsham Down for the interior, the blue bed of which has been selected by us generally for the aisles, in order that they may harmonize with the marble of which I am about to speak. The whole of the columns and responds, with their bases and capitals, are of Belgian marble, known on the Continent as "Belgian granite," and much used in old Flemish churches as well as in those of parts of France. The quarries from which we are obtaining this material are situated at Soignies, near Brussels, and are so extensive as to be

practically inexhaustible. This marble can be obtained in blocks of almost any size, and the isolated columns in this church are of single stones, two feet two inches in diameter, and about ten feet long. Its appearance is very similar to our Purbeck marble; though for richness and beauty of color, in our opinion, this Belgian marble is superior. It has also the advantage of being exceedingly cheap, owing to the comparatively low rate of wages paid in Belgium. This is being used for the first time in England for this work. Mr. Gough, who has visited the quarries, will, I am sure, be happy to give you any information regarding this excellent material, with which, I may add, it is the intention to line the inside walls of the church up to the string-course below the sills of the aisle windows. The whole of this marble that I have mentioned, with the exception of the capitals and bases of the columns, will be polished.

Before passing on to the next set of designs, I would call attention to the construction of the roof as being novel in ecclesiastical architecture, and different from any of those I have previously described. Iron for structural purposes has been hitherto rather the friend of the engineer than of the architect; indeed, to the latter, and I must own to myself, it has been almost held as an enemy. We should not have used it from choice in this instance, but the necessity for economy and the desirability of avoiding all lateral thrust upon the lofty clerestory walls and any visible ties which would have to cross under the vaulted ceiling, led us to its adoption. Mr. Gough's engineering knowledge acquired many years ago whilst in the Government service, has, I think, well solved the difficulties of the problem, though in a different manner to that in which I have attempted to do so. Each of the latticed wrought-iron principals is, in fact, a girder, exerting no outward thrust whatever, except, of course, what may be due to wind-pressure, which is felt in every roof, no matter what its construction may be. In this respect, the report of Mr. Bidder, the engineer, so entirely confirms Mr. Gough's opinion as to disarm further criticism, since æsthetic considerations are, in this instance, outside the question. No portion of the ironwork of the roof will be left visible, as there will be a ceiling with groining ribs below it, which it is intended to treat with colored decorations.

In the work of building the new church of St. Andrew at Redruth, in the county of Cornwall, I am associated as joint architect with Mr. James Hicks of that town. I call your attention to the drawings of this structure as it has some special features, and *The Architect* journal has undertaken to reproduce the whole of them in an unusually complete manner, as illustrations to accompany this lecture in its pages. The plan is that of a very wide nave with exceedingly narrow aisles, intended to serve as mere passages, beyond the north and south transepts and the chancel and chancel aisles. The east end of the nave is polygonal below and rectangular above. The site is on the slope of a steep hill, and thus space is obtained underneath the western portion of the church, and this is utilized for vestry accommodation and Sunday-school rooms. The approach from the basement story to the church is arranged so that the choir may file upwards by two staircases around the font, and then uniting, pass in procession down the central passage of the nave to the chancel. The district of Redruth possesses many striking varieties of building-stone, most of which we propose to make use of in the following manner:

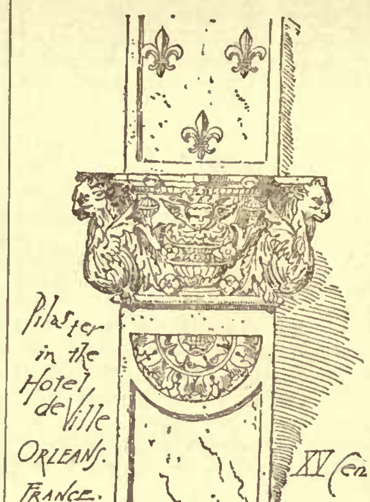
In the first place, granite will be used for all the quoins of the main angles of the building and for the buttresses. The chief element of expense in its use is that of the labor of dressing it, and not of the material itself, for the hills surrounding the town are chiefly composed of granite of the finest quality, samples of which may be seen in the balustrading of the Thames Embankment. The cost of working mouldings, undercutting, or tracery, however, render it inadmissible for such purposes. Box ground Bath stone from the quarries of the Messrs. Pictor has been chosen from among the west-country oolites in consequence of its excellent weather quality, for the finer dressings of the outside, and Corsham Down for those of the inside of the church. But Bath stone will be used as sparingly as possible, and only for the finest of the dressings. The secondary quoins and bands shown on the drawings, are of a local stone of a deep brown color, which, when used alone for huge masses of walling has a very sombre effect, but it forms an excellent bordering to enclose panels of brighter and more cheerfully-colored stones, such as white and red granite spauls, spar, Alvan, and other waste stones obtainable there at almost nominal cost.

The above stones, which are of light gray color, will be used for plain arches. We hope thus to show in solid and picturesque construction the adaptability of the several varieties of the peculiar building stones of the immediate neighborhood, and I am assured by Mr. Hicks that this result will be obtained at less cost than if any one particular kind of stone had been selected for use throughout, for while all those mentioned can be easily obtained in moderate quantities, no one sort can be had in sufficient amount without special quarrying.

I have now exhausted the list of what I had proposed to show you, with the exception of some drawings by Mr. George Frampton, architectural sculptor, of some incised cement work that he has recently executed for me in panels for wooden construction at Birchington-on-Sea, in the Isle of Thanet. Mr. Frampton is prepared to explain to you himself the method of their execution. They are, I think, very suggestive of what may be done to make that class of structure interesting and picturesque. The buildings consist of one-storied residences which we call there bungalows, and blocks of two-storied stabling attached to them. A series of these designs has been carried all round the latter upon a groundwork of black cement, but those on the main buildings are upon red, the figures in both instances being left in the natural color of the cement, tracked here and there with yellow. I had hoped to have had some photographs of the building to show you the general effect, and have not had time to make any special drawing instead.

In conclusion, I have only to apologize for the very desultory nature of these notes, and for the anachronism of the designs exhibited. Of this latter I am painfully conscious, and know that in all probability they will appear very like the last dying speech and confession of a dodo in these days of eclecticism, lacking all that piquancy which a concession to the fashionable mixture of styles would have given them. It is, however, too late for me to learn any other language of art than that I have learnt; I must be content, therefore, if from any of the fossils that I have unearthed, you have been able to glean either instruction or amusement.

FIRES AT AMERICAN HOTELS.



THE frightful catastrophe at Milwaukee, involving the loss of so many lives and the destruction of a hotel well known to travellers in the West before the Plankinton was built, may make of interest some notes on the subject of recent fires at American hotels. On the 30th of March, 1867, the old Lindell House was burned at St. Louis. It was one of the largest hotels in the world, and its burning involved a loss of $1,600,000, but of the 400 guests in the hotel at the time not one was injured, the fire being strongly contrasted in this respect with that at the Spottiswoode House at Richmond, Va., not long before, where several lives were lost. In 1868 the Ocean House at Newport was consumed on the 31st of October, and the Sherman House at Syracuse on the 30th of November. In the great fire at Chicago, October 8, 1871, all the great hotels were destroyed, including the Sherman, Tremont, Briggs, Mattison, Metropolitan, Massasoit, Richmond, Adams, Palmer, the newly completed Grand Pacific—in fact, very little in the way of hotels was left except the Michigan Avenue on the south side and the Eagle on the west. On the 11th of December, 1872, the Fifth Avenue in this city narrowly escaped destruction, ten servant-girls being unhappily suffocated in the dormitories. In 1874 the Grand Hotel at Saratoga was burned on the 1st of October. In 1875 there were reported nearly a dozen fires at hotels, the most important buildings destroyed being Congress Hall at Saratoga, burned in September, and the Gibson House at Charlestown, W. Va., destroyed on the 4th of that month. On the 11th of April, 1877, the Southern Hotel at St. Louis was burned, with a loss of from $750,000 to $1,000,000. Fifteen persons perished in the flames, local rumor having at first set down the number at 200. This was the most destructive conflagration of the sort in the West since the burning, during the war, of the Pacific Hotel at St. Louis, when thirty persons perished in a conflagration kindled by thieves who desired to plunder the house in the confusion or else to conceal a murder. The burning of the Southern provoked a close inquiry into the condition of the hotels of New York—not, it must be said, with very satisfactory results. On the 23d of January, 1881, the dining-room of the Metropolitan Hotel in this city was burned, the hotel and Niblo's Theatre narrowly escaping destruction. There had been a similar disaster in June, 1879. On the 16th of February Dr. Ray V. Pierce's Palace Hotel at Buffalo was destroyed, with a loss of $500.000, and on the 27th of July, Coney Island, which has thus far been very lucky in the matter of fires, received a scare in the burning of the Pierrepont House, with which was consumed the New York and Brighton depot. On the 11th of August the Parry House at Beach Haven, Pa., was burned, the 300 guests escaping from their beds with difficulty. Last month New York just missed two serious disasters, the fire in the Sturtevant House on the 11th being discovered just in time, and the blaze at the New York Hotel four days later being promptly mastered by the firemen. In the adjoining Dominion there have only been two really great fires at hotels during the last quarter of a century—one at Toronto about 1859, when the Rossin House was destroyed, and one at Montreal a few years ago, when several persons were suffocated in the St. James, the fire having cut off escape by the stairways. As to the safety of the average summer-resort hotel, it will only be necessary to cite the fact that an expert sent to Saratoga by the New York Board of Underwriters last year to inspect the heating and cooking apparatus of the hotels there reported that only four were safe. — *New York World.*

MR. J. M. CLARK'S PROPOSED METRIC SYSTEM.

No. 31 Pine St., NEW YORK, January 2, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The enclosed correspondence explains itself. The subject of Mr. Clark's paper is one that is now eliciting much careful thought from scientific men, and I have no doubt but that the readers of your admirably conducted journal will be pleased to have the metric system proposed by Mr. Clark thus succinctly brought to their attention. Very truly yours, etc.,

O. P. HATFIELD.

NEW YORK, December 29, 1882.

MR. JACOB M. CLARK:—

Dear Sir,—Please inform me if your "Metric System" has been published, and if not, whether you would have any objection to my offering it to the *American Architect* for publication.

Very respectfully yours, etc., O. P. HATFIELD.

119 Liberty St., NEW YORK, December 30, 1882.

MR. O. P. HATFIELD:—

Dear Sir,—An outline of the system, *currente calamo*, was included in my letter to the Committee of the American Society Civil Engineers on Standard Time, last May. The Chairman of the Committee, Mr. Fleming, printed the letter, with all the correspondence they had, in a communication to the President of the American Association for the Advancement of Science, at the Montreal Conference, last summer. Whether it appears in the published reports of that body I do not know.

I afterwards noticed that the mile agreed with the Turkish mile, and was enabled to trace the connection, through the Mosaic cubit, with ancient Oriental systems. I accordingly arranged the system in tabular form, with some marginal notes—as you have it—and distributed hectograph copies of it among thinkers, as I had opportunity, and among others to Mr. Latimer, President of the International Institute for Preserving and Perfecting Weights and Measures. It may appear in some of their publications, or those of the Ohio Auxiliary Branch, or it may not.

The polar axis, as a metric base, was pointedly advocated by Callet, when the present French system was being devised; and either the semi-axis, or the mean radius of the Earth, was probably the foundation of Ezekiel's system. The idea of connecting the *inch* with it did not occur to me until I read Dr. Seiss's work, "A Miracle in Stone." All the attempted arrangements I have seen have been affected in some way by unnecessary factors, and more or less crude notions of itinerary.

The effort on my part has been towards adjusting things more or less familiar, in the interest of ultimate maximum propriety and utility, and in accordance with human experience; and to include the best attainable division of the circle.

I am much obliged for your kind note: and it would certainly gratify me very much, if, under the above explanation, the *American Architect*, or any other scientific journal, shall be willing to aid in presenting the subject to the consideration of thoughtful men.

I have the honor to be truly yours, JACOB M. CLARK.

METRIC SYSTEM PROPOSED BY MR. JACOB M. CLARK.

(Arranged from correspondence with the Committee on Standard Time.)

Adjustment; increase the English inch, and also the Arabian guage or guz (= 25 English inches) each by its 1-1000 part.

For the Arts: Inch decimally subdivided.

Denomination.	Metric Feet.	
City, or Builders' chain,	100.	= 40 cubits = 5 rods = 4 perches. Value, 83.416 + English feet.
" " reed,	10.	= 4.
" " foot,	1.	the natural foot.
" " inch,	.1	= value, 1.001 English inches.

City lot = 30 × 120 feet = 12×48 cubits metric. 10.000 inches metric is the entire boundary of a square acre.

Engineering and Geodesy: Cubit decimally subdivided.

Denomination.	Metric Cubits.	
⊕'s semi-axis (polar),	10,000,000.	Grand unit for Astronomy and Geodesy.
" Acre (side),	100.	Convenient length for steel tape-chain, value 208.5416 + English feet.
" Perch,	10.	Convenient length for base-bar, value 20.854 + English feet.
" Cubit,	1.	unit for Engineering, levelling, etc.: value 25.025 English inches.

Solid cubit, the measure of Engineering quantities.

Superficial acre of 10,000 square cubits contains 43.489 44-100 square English feet, and differs from the English acre by 1-6 of 1 per cent.

Adaptations for Rural and Commercial Purposes.

8 cubits = metric rod = 200 metric inches, for land, etc.

2 cubits = metric staff = 50 metric inches, for wood, etc. The metric cord = about 1½ present cord.

Metric ell = 40 metric inches, for cloth, etc.

Circular Measure: Time, arc and angle measure.

Denomination.	Metric Degrees.	
Circle,	240.	The Zodiacal sign = 20 degrees metric.
Metric hour-angle,	10.	The quadrant = 60 " "
" degree,	1.	= 1½ degrees, current division.
" minute, or prime,	.1	
" second,	.01	
" third,	.001	

Geographic: Road and sea measure.

Denomination.	Metric Miles.	
Mean great circle,	24,000.	terrestrial, *upon radius of volume*.
" degree,	100.	
" offing,	10.	
Metric mile,	1.	Value = 5472 Eng. ft. = The true Turkish mile, ¼ of ancient parasang, sum of Jewish mile and ½ Sabbath day's journey.
" stadium,	.1	
" road-chain,	.01	= Knot measure, glass 1-100 of an hour. Mast-length, the height from which the horizon appears 10 miles away.
" fathom,	.001	= 3 Jewish civic cubits.
" span,	.0001	= 0.2621 cubits = 6 56-100 inches metric.

Metric furlong, or cable-length = 125 fathoms.
(Kilomètre of France = 6 10 of metric mile, very nearly.)

8 Furlongs, or 10 Stadia, or 328 Rods, or 2624 Cubits, or 6560 Feet metric } equal one mile and { ⅛ Mile = 41 Rods, ⅛ Furlong = 41 Cubits, 1-16 Stadium = 41 Feet.

JUSTIFICATION.

ST. LOUIS, January 12, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—My apology for this letter is your remarks in your issue of the 6th inst. concerning comments offered by various parties on the management of your journal.

When people are displeased, there is an active incentive to find fault immediately without waiting for some one else to do it for them; but when all moves well, a general silence is all the commendation the most of them are apt to bestow. Their minds are engrossed with daily cares from which there is no distracting call to offer assurances of approbation, and if the matter is ever thought of at all, there is an enervating expectation that some one else with more leisure will do it, and do it better than they can.

For myself, I beg to say that the conduct of the paper from the start has appeared to me very discreet, and in my intercourse with architects and other readers I have met no contrary opinion. I have thought the selections for editorial remark almost always interesting and well treated; the other original matter is generally of value and interest, and the extracts from foreign journals are almost always very acceptable. I can hardly believe that any thoughtful architect would seriously state that he "never cared for the reading matter." A regular subscriber to the leading foreign architectural papers might possibly find in them all the instruction he might care for, but I have observed that those papers occasionally publish liberal extracts from the *American Architect*, and there is much local intelligence of interest, if not of higher value, which is to be found only in your columns.

I have also enjoyed the scholarly quality which has always characterized the paper, a quality which is not so common in journalistic work that its presence may be overlooked.

Concerning the illustrations, the responsibility of always providing every week without omission or delay four pages of acceptable architectural engravings has appeared to me one of the most serious burdens connected with the enterprise. I think the manner in which this has been accomplished so far is most creditable to the managers.

I do not bind the reading matter with the illustrations, because, for utility, I separate the latter, classify them and keep them by themselves. When I want a suggestion about a town-hall I do not want to hunt through a dozen volumes of designs for churches, stores and dwellings.

I prize the monthly sheet of details highly as a check to the tendency to mannerism to which all are subject. I like the Foreign Exchange illustrations which often give some of the best of the illustrations in foreign journals. I could only wish concerning some of them that they were printed to larger scale. I value the "parallels" of towers, dormers, etc., and hope for more of them, and in general my desire would be for precisely the same quality of management in the future as in the past, only *more so*. I hope this letter may not seem to you uncalled for or egotistic.

I am very respectfully yours,

C. E. ILLSLEY.

[IT would be unreasonable not to be pleased by what Mr. Illsley says, and we are willing to believe that a large percentage of our subscribers feel as he does even if they do not feel impelled to so express themselves. As for our intentions, we believe that they are all that the most exacting subscriber could require, as our modest aim is simply to publish as perfect and unexceptionable a journal in all its parts as human endeavor is capable of accomplishing. Until all men are made in the same mould, however, we cannot expect that all our subscribers will agree as to the exact time when we shall have attained the sublime altitude our ambition strives after, but every expression of opinion we receive is a help, as it serves as a guide-post to encourage or deter us from the course we are pursuing. We do not object to criticism, and we court suggestion. Indeed, we believe that nothing could be more reciprocally beneficial than for each and every subscriber to send us a postal-card saying, "I approve of this. I disapprove of that." "Give us more of this; not so much of that." It is only by the comparison of suffrages that the golden mean can be determined; for in spite of all their pretense, editors are not omniscient. As in the other walks of life, we learn more from our failures than from our successes, largely because, as Mr. Illsley says, men oftenest have the charitable impulse to tell you you are wrong; but it is a consequence of the general *laissez aller* that owing to some inborn misgiving, which grows in the absence of expressed approval,

we may at any moment discontinue some feature or department of the journal which the majority of our subscribers find peculiarly acceptable. In the past we have occasionally endeavored to ascertain our whereabouts in the fog of uncertainty by addressing to those subscribers who notified us of their desire to discontinue their subscription, a circular letter, courteously worded, begging to be informed of the reason for such discontinuance, not, as may be imagined, with any intention of urging a reconsideration of the order or impugning the justice of the reasons which led to the order being given, but simply and solely to secure from the discontented subscriber some hint which would lead to our making such alterations and improvements in the journal as should result to the greater satisfaction of the remaining subscribers: and should we ever have recourse to the same expedient, we trust that our real motive may be remembered. Mr. Illsley's qualified approval of our habit of reprinting extracts from foreign journals leads us to say that we hold it an editor's chief duty that his journal shall contain the best material procurable, and that originality, as such, is far from being the first essential, and we would much prefer to edit a journal wholly eclectic but of indisputable value, than one which sacrificed the permanent value of his publication to the shibboleth of originality. We have pursued our course in this respect with the less misgiving from the knowledge that a comparatively small percentage of our own subscribers see the extracted articles in their original publications.—Eds. American Architect.]

IMITATION MARBLES.

Pittsburgh, Pa., January 5, 1883.

To the Editors of the American Architect: —

Gentlemen, — I would like to know the name of a firm which can furnish and work imitations of antique marbles for columns, etc., such as "rosso antico," "verde antico," "giallo antico," and "terrazzos" or mosaic floors, and also "stucco lustro." The workmen used to be Italians and Frenchmen, as far as I know.

Very respectfully,

C. Leo Staub.

[Try Guelton Marble Co., 508 West Twenty-Fourth Street, New York, or George W. Seaman, 39 Dey Street, New York. — Eds. American Architect.]

UNUSED DRAWINGS.

To the Editors of the American Architect: —

Dear Sirs,—Can you conveniently refer to an opinion already given by yourselves, or now give one for reference to a client, of the propriety of charging separately for a first set of general plans and specifications, and procuring bids on same, which were subsequently abandoned as too expensive, although made under special directions of building committee without limitation of price, a second set having subsequently been made and executed, and settled for by a division of bill presented for services. Please also name customary proportion to total service. By doing this, you will much oblige

Yours truly,

James Freret.

[It is usual to charge for extra drawings and specifications, but in case of the subsequent execution of the work from new drawings at a reduced scale of expense, the study spent on the first set would be in great part available for the second, and a charge of regular commission for each set as if they were for separate buildings might not be quite equitable. The best way, we think, would be to ask a fair price for the time expended upon the unused set of drawings.—Eds. American Architect.]

NOTES AND CLIPPINGS.

The Subterranean Cable from Paris to Marseilles.—The laying down of the telegraphic wire which is to put Marseilles in direct communication with the capital is being rapidly pushed forward. Two hundred and fifty workmen are at present employed on the right bank of the Rhone, following the high-roads as far as possible. The cable is enclosed in a cast-iron pipe, laid at a depth of 5 feet 6 inches underground, the joints of the pipes being covered with India-rubber washers and leaden rings. About every 550 yards the cable passes through a covered chamber of cast-iron fitted with a man-hole, by means of which it can be inspected. About every 110 yards the pipes are connected by cast-iron boxes, which also enable the wires to be inspected and repaired. The expense of the whole work is estimated at forty million francs, or £1,600,000. When this line (which may be said to traverse the length of France) shall be completed, it is intended to connect it with the Transatlantic and Mediterranean cables.—*Engineering.*

Mont Saint-Michel Threatened. — Every one will sympathize with the efforts which were made a day or two ago in the French Chamber to save Mont Saint-Michel from ruin. It appears that the buildings have been in imminent danger for the last year or so, owing to a dike which has been constructed to connect the island with the mainland. A protest was made in the Chamber a year ago against this piece of "scientific barbarism" on the part of the engineers, and the Minister of Fine-Arts was instructed to confer with the Minister of Public Works on the subject. Nothing, however, has come of these negotiations, which have been further complicated by the intervention of the Minister of Marine, who has put in a claim to be the official most concerned. Meanwhile the sea, "whose interference is always in order," has made some serious breaches, and unless the dike is promptly destroyed the architects of the Fine-Arts Department and the engineers of the Public-Works Department will soon have the congenial task on hand of "restoring" the present buildings. A new commission, on which no engineers are to sit, is to be at once appointed; but should it report in favor of destroying the dike not only the Minister of Marine but the Minister of War is to be first consulted, so that the prospects of saving Mont Saint-Michel do not seem to be very hopeful. — *Pall Mall Gazette.*

Indictment against a City.—At the September (1881) term of the Superior Court the City of Portland, Me., was indicted for allowing sewer deposits to accumulate in a dock, creating a nuisance. The defendant demurred, contending that the municipal corporation could not be indicted for a nuisance of that nature. The opinion of the full bench, just received, sustains the indictment.

Roman Catholic Cathedral for London. — London's new Roman Catholic cathedral, to cost $1,250,000, is probably to be begun in the spring.

Tintern Abbey Threatened.— "The shade of Wordsworth," writes an indignant correspondent, "will surely arise and protest against the rumored proposal of the Midland Railway to construct a new line close to the ruins of Tintern Abbey. Is 'the still, sad music' of humanity which now vibrates in the memory amid such scenes of undisturbed repose to be exchanged for the shrill scream of the railway whistle? Are those 'steep woods and lofty cliffs, and that green pastoral landscape,' which were endeared to Wordsworth both for themselves and for his sister's sake, to be polluted by cuttings and sidings, and are the worshippers of nature, to whom the ruins have been invested with a new charm by the lines of the poet, to be banished from the spot? To justify the destruction of the privacy of the winding Wye at Tintern, the strongest proofs of the necessity of the new line of railway must be required, and there can be little doubt that the wants of the district are fully met by the existing accommodation." — *Pall Mall Gazette.*

Historic London Fires. — Alluding to the recent conflagration in London a contemporary calls to mind the fact that London has suffered more than any city, save Rome and Alexandria, by fire. So early as 786 the rude city of the Anglo-Saxons was completely obliterated. In 982 the rebuilt city was almost destroyed. In 1086, under the Normans, when some pretence to architecture had been evinced by the conquering race, every church and house from the east gate to the west was burned down. In 1212 it was almost completely destroyed again. In 1665 a fire began in an obscure wooden house in Pudding Lane, and continuing for three days, traversed the very same district outlined in the dispatches. Buildings on 436 acres, subdivided into 400 streets, were left an undistinguishable mass of ruins. The loss included St. Paul's Church, the Guild Hall, the Royal Exchange, the Custom House, twenty hospitals, eighty-six parish churches and six chapels, fifty-two halls of royal guilds, together with many stately edifices, including bridges over the Thames, Newgate and other prisons. Only six persons, however, were killed, and the loss in cash was set down at $51,000,000. The city recovered with difficulty from this dreadful calamity, but the lesson seems to have been unheeded, for the crowded buildings went up on the same sites and the city has several times since 1666 suffered enormous losses — notably in 1794, when 630 houses were burnt in one conflagration, and again in 1834 and 1861, when the Parliament Houses and docks were destroyed. Tenaciously conservative in this respect as in all others, the English refuse to be governed by experience or take lessons from their neighbors. For it is remarkable that Paris and other Continental cities, though frequently in peril, have never, even when set on fire, suffered to the same extent as the British capital. — *Fireman's Journal.*

An Incombustible House. — According to the Reading (Pa.) *Eagle*, Mr. George L. Huston of Parkesburg, Pa., contemplates the erection of a private mansion which will be built entirely of iron, except the foundations, which are to be of solid rock. The floor of the hall, vestibule and library will be laid with polished cast-iron tiles, and by using different qualities of iron it is thought that a very pleasing effect will be produced. All the other floors of the house will be of stout iron plates firmly bolted to the iron joists. The outside walls and inside partitions all through the structure will be composed of two courses of iron plates firmly bolted together, so as to be air-tight. These hollow iron walls and partitions will be used instead of chimneys and for conveying heat to different parts of the house, and for ventilation. The hot smoke and gases from the furnaces passing through the sides of the rooms in this way will, it is claimed, be almost sufficient to keep the house comfortable in the coldest weather. All the doors and window-sashes will also be of iron, but will be constructed in such a light way and so nicely balanced upon hinges and weights as to open and shut as easily as those made of wood. All the inside walls and partitions will be handsomely painted and frescoed, so as to present the appearance of an ordinary house finished in plaster. Outside, the style of architecture will be light and graceful, and it will be painted and ornamented so as to look as if it was built of wood. The roof will be of strong boiler-plate, and on the top, at the convergence of the four gables, will be a handsome observatory supported at the corners by four Ionic pillars of iron. Inside, the ornaments will be of the same material. In the parlor will be a mantel of polished steel, handsomely ornamented. There will be a similar one in the dining-room, upon which will be engraved hunting scenes. In the library will be a massive mantel so constructed that it will look as if it was made of pig iron fused together. Quite a curiosity in this room will be a cabinet for the exhibition of specimens of iron. This will be constructed entirely of strongly magnetized iron, so that all the specimens will adhere to the back of it, held in place solely by magnetic attraction. In order to guard against the bulging which would take place in such a solid iron structure on account of the contraction and expansion caused by the heat and cold, there will be breaks in the iron at intervals which will be filled with rubber, so that when expansion takes place there will be room for it without producing any change in the contour of the framework. As much as possible of the furniture will also be of iron, so that if it takes fire in any part nothing can burn but the carpets and the few articles of wood that may be within reach of the flames. The house will be an architectural and scientific curiosity. Mr. Huston admits that it may cost twice or three times as much as an ordinary house, but claims that with a little attention it will last for centuries without repairs, and will never cost a cent for insurance.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

270,199. DOOR-KNOB ALARM. — Alonzo T. Boone, Chicago, Ill.

270,200. AUGER AND GIMLET. — William W. Brigg, Washington, D. C.

270,211. WATER-CLOSET SHUT-OFF. — John Farthing, Chicago, Ill.

270,229. SASH-HOLDER. — George W. Lewin, Fall River, Mass.

270,281. APPARATUS FOR SUPERHEATING STEAM AND HEATING AIR. — Solomon N. Carvalho, New York, N. Y.

270,295. LIFE-SAVING APPARATUS FOR PRIVY-VAULTS. — John Fleck, Louisville, Ky.

270,297. SHINGLING-MACHINE. — Alexander Fraser, Detroit, Mich.

270,309. WICKET. — M. La Rue Harrison, Washington, D. C., and Franklin Underhill, Stamford, Conn.

270,310. SHUTTER-WORKER. — John W. Harrison, Wheeling, W. Va.

270,332. FIRE-EXTINGUISHER APPARATUS. — William K. Platt, Philadelphia, Pa.

270,333. CASING FOR WATER-CLOSETS. — Charles F. Pike, Philadelphia, Pa.

270,334. COCK FOR WATER-CLOSETS. — Charles F. Pike, Philadelphia, Pa.

270,335. WATER-CLOSET. — Charles F. Pike, Philadelphia, Pa.

270,337. CONSTRUCTION OF GLAZED ROOFS. — John E. Rendle and Frank B. Rendle, Westminster, England, and David H. Wilson, Hyères, Var, France, executors of Wm. E. Rendle, deceased.

270,340. DEVICE FOR OPENING AND CLOSING SKY-LIGHTS. — Jeffrey H. Rose, Brooklyn, N. Y.

270,317. SASH-FASTENER. — Elbridge J. Steele, New Britain, Conn.

270,356. COMBINED WRENCH AND PINCHERS. — Samuel L. Willmer, Anderson, Cal.

270,359. DRYING HOUSE OR KILN. — William A. Allen, Jersey City, N. J.

270,368. DOOR-SPRING. — Warren S. Barlow, Paterson, N. J.

270,379. LIGHTNING-ROD. — John H. Brandon, Chicago, Ill.

270,419. SAW-HANDLE. — Benjamin Goulton, Kaco, Wangaroa, New Zealand.

270,425. ADJUSTABLE WINDOW-CORNICE. — Wm. C. Hamnett, Toledo, O.

270,436. ROOFING COMPOUND. — Horace H. Hutchins, Maquoketa, Iowa.

270,450. SILICATED PAINT. — Michael Mathes, Jersey City, N. J.

270,451. FIRE-ESCAPE. — Wm. McCaughey, Greenville, O.

270,469. WINDOW-SCREEN. — Richard J. Parrett, Portland, Ind.

270,473. STENCH-TRAP. — Herman Pietsch, Flatbush, N. Y.

270,476. SEWER AND DRAIN TILE. — George J. M. Porter, Princeton, Ill.

270,532. SAWING AND CHANNELING MACHINE. — Daniel W. Williams, Springville, Cal.

270,542. SASH-FASTENER. — Howard B. Frost, New Britain, Conn.

270,554. EXPANDING ROSE-BIT. — Theodore G. Pelton, Lyons, Iowa.

SUMMARY OF THE WEEK.

Baltimore.

DWELLING. — Mr. Chas. L. Carson, architect, is preparing drawings for a residence for Dr. H. P. C. Wilson, on Park Ave. It is to be of brick and stone, 16' x 80', and to cost $10,000.

LOCOMOTIVE-WORKS. — The locomotive-works of Messrs. T. H. Paul & Sons, at the s e cor. of Wells and Bird Sts., are nearing completion. Two buildings are already under roof. One of the buildings, 55' x 155', running parallel with Wells St., will be used for the erection of locomotives. The second building, 40' x 140', will be fitted up for the manufacture of the various parts going to make up a locomotive. A foundry-building will be erected as soon in the coming spring as possible.

BUILDING PERMITS. — Since our last report nine permits have been granted, of which the following are the more important: —

Buck & Jackson, 5 two-st'y brick buildings, w s Camel Alley, between Preston and Biddle Sts.; also 11 two-st'y brick buildings, w s Mason Alley, between Linden Ave. and Bolton St.

John Weitzell, 4 two-st'y brick buildings, e s Madeira Alley, 57' s of McElderry St.

Louis Wese, 3 two-st'y brick buildings, w s Fremont St., 40' s of Winchester St.

S. T. Richardson, 2 two-st'y brick buildings, w s Vincent Alley, between Lorman and Presstman Sts.

Thompson & Stone, 9 two-st'y brick buildings, e s Castle St., between McElderry and Monument Sts.

Ida V. Rutter, two-st'y brick building, s s Miller St., between Bond St. and Broadway.

Geo. W. Harper, three-st'y brick building, with two-st'y brick back building, n e cor. Oliver St. and Central Ave.

Boston.

BUILDING PERMITS. — *Brick.* — *Marginal St.*, rear, nearly opposite Lamson St., Ward 2, for Boston & Albany Railroad, one-st'y pitch engine-house, 20' x 30'.

George St., *No.* 32, rear, Ward 20, for Thomas F. Scanlon, one-st'y flat dry-house and manufactory, 25' x 32'; Edward Lynch, builder.

George St. No. 32, rear, Ward 20, for Thomas F. Scanlon, one-st'y flat dry-house and manufactory, 25' x 32', with ell, 16' x 40'; Edward Lynch, builder.

Old Harbor Point, near Harbor View St., Ward 24, for city of Boston, one-st'y pitch pumping-station, 134' x 223' 9".

Wood.—Grove St., rear, near Washington St., Ward 23, for Louis Weber, one-st'y pitch storage, 16' x 18'; John String, builder.

River View St., cor. Huntoon St., Ward 24, for Nathan Hunt, two-st'y pitch dwell., 20' x 40'; F. M. Severance, builder.

River View St., Ward 24, for Nathan Hunt, two-st'y pitch dwell., 20' x 40'; F. M. Severance, builder.

Harwood St., near Wales St., Ward 24, for Samuel P. Falkner, owner and builder, two-st'y pitch dwell., 20' and 24' 6" x 30'.

Maxwell St., near Milton Ave., for Battista Grazlana, two-st'y pitch dwell., 20' and 24' x 28'; ell, 13' x 15'.

Huntoon St., near Butler St., for Joseph H. Whitney, one-st'y pitch dwell.

I St., rear, near East Ninth St., Ward 14, for Michael Shady, one st'y pitch boat-storage, 20' x 40'; Henry Borden, builder.

Unnamed St., near Quincy St., Ward 24, for Ada C. Rice, one-st'y flat building for mechanical purposes, 20' x 30'; Thomas Rice, builder.

Milton Ave., near Evans St., Ward 24, for Hammond H. Haskell, 2 two-st'y pitch dwells., 15' and 26' x 34'; ells, two-st'y, 16' x 18'; Stinson & Cleveland, builders.

Terrace Ave., near Ashley Ave., Orient Heights, for John O. Barrett, two-st'y hip dwell., 26' x 34'; Judah Bacon, builder.

Regent Sq., *No.* 5, Ward 21, for Geo. L. Thayer, one-st'y mansard dwell., 19' and 23' x 28' and 39'; one-st'y mansard dwell., 19' and 23' x 39' and 44'; ells, 14' x 17'.

Brooklyn.

SCHOOL-HOUSE. — Clarence S. Luce, of Newport, has been awarded the prize of $250 in the late school-house competition.

BUILDING PERMITS. — *Seventeenth St.*, n s, 200' e of Fifth Ave., 5 three-st'y frame tenements, tin roofs; cost, each $2,500; owner, E. F. Hermans, 256 Prospect Ave.; architect and builder, Geo. Hermans; mason, not selected.

Suydam St., n s, 160' e of Broadway, two-st'y frame tenement, tin roof; cost, $3,000; owner, J. Freitag, 214 South Third St.; architect and builder, Peter Johnson.

Gates Ave., n s, 270' e of Classon Ave., 3 three-st'y brick dwells., tin roofs; cost, each $10,000; owner and builder, D. H. Fowler, 14 Verona Place; architect, A. Hill; mason, W. Raul.

McKesson Place, n s, 265' w of Schenectady Ave., 15 two-st'y frame dwells., gravel roofs; cost, each about $1,500; owner, J. McKesson; architect and builder, W. J. Wilson.

Stagg St., *Nos.* 262 *and* 274, s s, 175' and 325' w of Waterbury St., 2 two-st'y frame tenements, tin roofs, cost, $5,000; owner, Chas. R. Baker, 241 Washington Ave.; architect, T. Engelhardt; builders, J. Rauth; and C. Wilbur.

Chicago.

HOUSES. — J. O. Smith will build a house in Winnetka, a suburb of Chicago, on the lake shore, on the seaside plan, with large verandas; Messrs. Edbrooke & Burnham furnish the plans; cost, $10,000.

George P. Dunham is to build a fine residence at Evanston, another suburb of Chicago, from designs by the same architects, which will cost $10,000.

John C. Cummings will build a residence on Dearborn Ave., to cost $10,000, from designs by the same architects.

Henry Neuviler has taken out permit for two-st'y and basement residence, 22' x 65', of pressed brick and stone finish, at 557 Larrabee St.; cost, $5,500; J. W. Ackerman is the architect.

APARTMENT-HOUSE. — F. Welsh is to build three flats, on the corner of Dearborn and Thirtieth Sts., 22' x 65' each, of Indiana pressed brick and stone trimmings, to be two-st'y and cellar, and will cost $15,000; from plans by J. W. Ackermann.

CLUB-HOUSE. — The Chicago Jockey Club, it is said will build a $500,000 club-house.

BUILDING PERMITS. — J. S. Clark, three-st'y and basement brick dwell., 26' x 80', 356 Ohio St.; cost, $15,000.

Henry Neuviler, two-st'y brick dwell., 22' x 65', 557 Larrabee St.; cost, $5,500.

Andrew Scott, five-st'y and basement brick store and dwell., 24' x 90', No. 86 Fourth Ave.; cost, $22,000.

E. S. Blood, one-st'y brick store, 20' x 42', 3100 Archer Ave.; cost, $1,400.

Ed. Horner, one-st'y cottage, 22' x 50', 2919 Archer Ave.; cost, $2,500.

M. Mercer, three-st'y brick store and flats, 23' x 75', 329 Polk St.; cost, $6,000.

Arnold Bros., two-st'y brick flats, 50' x 66', Irving Pl., near Adams St.; cost, $9,000.

Mary Fahey, one-st'y brick cottage, 20' x 50', 549 West Ohio St.; cost, $1,200.

Mrs. Day, two-st'y brick dwell., 25' x 60', 3631 Ellis Ave.; cost, $6,000.

Wm. Pound, three-st'y brick dwell., 20' x 60', 3835 Johnson Pl.; cost, $3,000.

O. M. Wells & Co., one-st'y brick cottage, 20' x 40', on Tallman St., near Milwaukee Ave.; cost, $1,200.

John Bednorz, three-st'y and basement brick stores and flats, 49' x 160', 88 Fisk St.; cost, $10,000.

C. E. Robinson, three-st'y brick store and dwell., 30' x 40', 561 and 563 South Clark St.; cost, $6,000.

P. A. Cashman, two-st'y brick dwell., 20' x 50', 1222 West Harrison St.; cost, $2,500.

Cincinnati.

HOUSES. — Brick residence for Mr. A. Enneking, Woodburn Ave., Walnut Hills; cost, $6,500; Geo. W. Rapp, architect.

Double limestone dwell., cor. of Grand Ave. and Nassau St.; cost, $14,000.

BANK-BUILDING. — It is rumored that the Emery Brothers will erect an eight-st'y building on the site of St. Paul's church, recently purchased by them, to be used as a bank on the first floor and offices above. The lot is 66' front on Fourth St. and 100' deep; the building to be of the best character throughout; Mr. Samuel Hannaford, architect.

ADDITION. — Mr. A. E. Muth is to build an addition to his bakery on Central Ave., from plans prepared by Mr. E. Anderson, architect. The building is four-st'y, 37' x 47', and will cost $10,000.

STORES. — James S. Armstrong has let contracts for the building of two stores on Third St., near Elm, from plans prepared by Mr. Henry Bevis, architect, 62' x 100', five-st'y, freestone front; cost, $45,000.

CLUB-HOUSE. — Mr. Geo. W. Rapp, architect, has prepared plans for a club-house for the Walnut Hills Club, to be built of frame, on s w cor. of Moonman Ave. and Clay Sts.; cost, $7,000.

New York.

CASINO. — Though the Casino is open, the work is not yet completed on the building, and Messrs. Kimball & Wisedell are still at work on plans of the interior.

BANK. — The Citizens' Savings Bank is to have an important addition, 25' x 85'; the entrance is to be remodelled; the improvements will cost $40,000; Mr. F. C. Withers is the architect.

BUILDING PERMITS. — *Nassau St.*, e s, from Cedar St. to Liberty St., nine-st'y brick and stone office-building, fire-proof roof; cost, $1,000,000; owner, Mutual Life Insurance Co., 144 Broadway; architect, Chas. W. Clinton; mason, Joseph Thompson.

One Hundred and Forty sixth St., s s, 125' e Wills Ave., two-st'y frame tenement, tin roof; cost, $3,000; owner, Elizabeth Muller, 666 One Hundred and Forty-sixth St.; architect and builder, Louis Falk.

Thirty-eighth St., s s, 75' e Sixth Ave., five-st'y brick store, tin roof; cost, $15,000; owner, Gustas H. Saiit, 1382 Broadway, architect, V. B. Ferdon; builder, Jas. P. Niblo.

Third Ave., n e cor. One Hundred and Fourth St., five-st'y brick flat and store, tin roof; cost, $18,000; owner and builder, Thos. Fealey, n e cor. Third Ave. and One Hundred and Sixteenth St.; architect, Barth Walter.

Third Ave., e s, 20' n One Hundred and Fourth St., 3 five-st'y brick flats and stores, tin roofs; cost, each, $15,000; owner, builder and architect, same as last.

One Hundred and Fourth St., n s, 72' e Third Ave., four-st'y brick tenement, tin roof; cost, $13,000; owner, builder and architects, same as last.

Second Ave., s w cor. One Hundred and Fourth St., 4 four-st'y brownstone front tenements and stores, tin roofs; cost, each $12,500; owner, Ellen Murray, 315 East One Hundred and Sixteenth St.; architect, Andrew Spence.

One Hundred and Sixth St., s s, 73' w of Second Ave., four-st'y brownstone front tenement, tin roof; cost, $13,500; owner and architect, same as last.

One Hundred and Fourth St., n s, 250' e of Ninth Ave., three-st'y brownstone front dwell., tin roof; cost, $18,500; owner, Charles D. Thompson, 21 West Eleventh St.; architect, Geo. M. Huss; builder, J. Coar.

St. Nicholas Ave., n w cor. One Hundred and Fifty-fourth St., 11 three-st'y brick dwells., mansard slate roofs; cost, each, $9,000; owner, John Kelly, 34 East Sixty-ninth St.; architect, Jas. Stroud.

Fifty-first St., s s, from Broadway to Seventh Ave., two-st'y brick stable, tin roof; cost, $35,000; lessee, C. Alfred Skrine, 363 West Forty-second St.; architect, H. J. Dudley.

Fifty-ninth St., n s, 30' e of Ninth Ave., five-st'y brick tenement and store, tin roof; cost, $18,000; owner, Mary J. Odell, 48 West Thirty-third St.; architect, Jno. Sexton; builder, E. H. Miller.

Fourteenth St., s s, 180' e of Thirteenth Ave., three-st'y brick factory, gravel roof; cost, $14,000; owner, Electric Candle Co., Fourteenth St., cor. Thirteenth Ave.; builders, O. E. Perrine and J. G. McMurray.

Twenty-third St., s s, 180' w of Seventh Ave., twelve-st'y brick flat, brick roof; cost, $300,000; owners, Thomas C. Van Brunt, et. al.; architects, Hubert Pirsson & Co., 19 East Twentieth St.

East Twenty-fourth St., *No.* 331, five-st'y brick tenement, tin roof; cost, $18,000; owner, Chas. Watkins, 302 East Forty-first St.

ALTERATIONS. — *Wooster St.*, *No.* 104, raise attic, new flat roof and one-st'y brick extension, etc.; cost, $5,250; owner, Geo. Rueckert, 116 Canal St.; architect, F. Klemt; builders, Wagner & Pfeiffer.

Park Row, *Nos.* 13 *and* 15, raise one-st'y; cost, $10,000; owner, John H. Cheever, 89 Fifth Ave.; architect, Geo. E. Harding.

Fulton, Water and Pearl Sts., United States Hotel, interior and exterior alterations; cost, $10,000; owner, Daniel C. Blodgett, 43 West Eighteenth St.; architect, James M Magregor; mason, Wm. Haw.

Market St., *No.* 52, raise attic to full story, new flat roof; also, a three-and-one-half-st'y brick extension; cost, $4,000; owner, Henry Schmuetsh, 85 South St.,; architect, Chas. Schmeiser.

Philadelphia.

BUILDING PERMITS.—*Paschall St.*, n s, near Sixtieth St., one-st'y mill, 60' x 60'; J. J. Hunter, owner.

Wyalusing Ave., n s, bet. Fifty-fourth and Fifty-fifth Sts., two-st'y slaughter-house and stable, 16' x 40'; Chas. Christine, owner.

Main St., w s, bet. Mt. Pleasant and Carpenter Sts., three-st'y brick building, 19' x 20'; Tourison Bros., contractors.

South Fifth St., *No.* 260, three-st'y factory and two-st'y foundry, 30' x 60' and 30' x 32'; Yeaton & Harris, owners.

Bailey St., s w cor. Oxford St., two-st'y dwell., 19' x 36'; Christian Siebel, owner.

Jasper St., n w cor. Clearfield St., rebuilding dye-house, 16' x 32'; Dickson Bros., contractors.

Twenty-sixth St., w s, n of Pine St., two-st'y stable, 35' x 70'; Thompson & Bro., contractors.

St. Louis.

BUILDING PERMITS. — Thirteen permits have been issued since our last report, of which seven are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Mrs. Heath, two-st'y brick dwell.; cost, $2,600; C. H. Burch, contractor.

Nagel & Johnston, two-st'y brick dwell.; cost, $6,300; contract sub-let.

H. Seisnal, two-st'y brick dwell.; cost, $5,000; I. Stock, contractor.

Culver Bros., one-st'y foundry; cost, $10,000; W. C. Slicer, architect; contract sub-let.

Bids and Contracts.

DANVILLE, VA. — The following is a synopsis of bids received for glass for the court house, etc., at Danville, Va.

Edward A. Boyd & Sons, $593.92; John Gibson, $755; Joseph Thomas & Son, $845; William Glenny & Co., $725; Holbrook Bros., $932.55. The bid of Edward A. Boyd & Sons, the lowest, has been accepted.

PADUCAH, KY. — The following is a synopsis of bids received at this office under advertisement dated December 4, 1882, for plastering for the court-house and post-office at Paducah, Ky.

Joseph Eastman, $2,450; Smith & Crimp, $2,595; Hedges & Vint, $3,727.80; James Hughes, $4,032; D. W. Lloyd, $4,200; Mike J. Ford, $4,700. The lowest bid has been accepted.

TOPEKA, KAN. — The following is a synopsis of bids for slating the roofs of the court-house and post-office building at Topeka, Kan. (advertisement of December 15, 1882): Knisely Bros. & Miller, $2,800; W. W. Selby (informal), $2,800; Edward Williams, $2,860; George B. Clarke, $4,100. The bid of Knisely Bros. & Miller has been accepted.

General Notes.

ALBANY, N. Y. — There was paid from the Treasury for the construction, etc., of the new capitol during the fiscal year ending September 30, 1882, as follows:

Advances to commissioners	$1,210,000.00
For expenses and maintenance	56,156.25
Interest on award for lands	600.00
Total	$1,266,756.25

BEDFORD, N. Y. — Mr. James F. Sutton is building a large ice-house, bowling-alley building, and other out-buildings from the designs of H. Edwards Ficken, of New York.

WINONA, MINN. — Below is a recapitulation of several columns of matter in one of our daily papers, relating to the building improvements, etc., finished in this city during the past year: —

Pumping-works and extension of water-mains	$60,000
Ferry-road	15,000
Churches	35,200
Schools and grounds	7,000
Business blocks and improvements	35,000
Elevators and warehouses	25,000
Manufactories	194,800
Residences	200,000
Gas works and mains, estimated	3,000
Miscellaneous improvements	20,000
Total	$595,000

SWAMPSCOTT, MASS. — The Ocean House, at Swampscott, which was burned last fall, is to be rebuilt in the Queen Anne style, by Messrs. Hatch & Fernald, of Lynn. The building will be five-st'y, 70′ x 200′; its estimated cost is $75,000.

WASHBURN, ME. — A Baptist church is building here.

WINNIPEG, MANITOBA, B. N. A. — A large brick church and parsonage has just been completed here for the First Congregational Church, at a cost of about $40,000; J. Greenfield, architect.

PROPOSALS.

BRIDGE MASONRY.
[At La Passe, Can.]

Tenders will be received **up to the 8th of February next**, for the putting in the foundations and building the masonry for a bridge over the Ottawa River at La Passe; also, for the iron superstructure of same, erected complete to receive the track.

Plans and specifications may be seen on and after the 16th January next, at the contractor's office, No. 7 Place d'Armes Hill, Montreal.

C. N. ARMSTRONG,
370 Contractor.

HEMLOCK PLANK.
[At Montreal, Can.]

HARBOR COMMISSIONERS' OFFICE,
MONTREAL, January 15, 1883.

The Harbor Commissioners of Montreal invite tenders for the supply of about 450,000 feet board measure hemlock plank for 1883, according to specifications to be obtained at the office of Mr. John Kennedy, Chief Engineer.

Tenders addressed to the undersigned will be received **until Tuesday, the 23d inst., at 12 o'clock, noon.**

The Commissioners do not bind themselves to accept the lowest or any tender.

H. D. WHITNEY,
369 Secretary.

POST-OFFICE FITTINGS.
[At Belleville, Ont.]

DEPARTMENT OF PUBLIC WORKS,
OTTAWA, January 9, 1883.

Sealed tenders, addressed to the undersigned, and endorsed "Tender for Fittings," will be received at this office **until Tuesday, the 6th day of February next**, for the new fittings required in the post-office, Belleville, Ont.

Plans and specifications can be seen and all necessary information obtained at the custom-house, Belleville, and at the Department of Public Works, Ottawa, on and after Tuesday, the 16th day of January.

Tenders must be made on the printed forms supplied.

Each tender must be accompanied by an accepted bank check, made payable to the order of the Hon. the Minister of Public Works, equal to five per cent of the amount of the tender, which will be forfeited if the party decline to enter into a contract when called on to do so, or if he fail to complete the work contracted for. If the tender be not accepted, the check will be returned.

The Department will not be bound to accept the lowest or any tender.

By order, F. H. ENNIS,
370 Secretary.

PROPOSALS.

COURT-HOUSE.
[At Charlotte, Mich.]

In consequence of the destruction of the plans for Eaton County Court-House, by the burning of the architect's office in Hall Block, Toledo, O., the date of the letting of the contracts is postponed to January 24, 1883.

D. W. GIBBS & CO.,
Architects.

LOCK.
[On the Great Kanawha River, W. Va.]

U. S. ENGINEER OFFICE,
CHARLESTON, KANAWHA CO., W. VA.,
December, 10, 1882.

Proposals for building lock No. 2, of the Great Kanawha River, will be received **until noon of January 31, 1883**, and opened immediately thereafter.

Blank forms and specifications can be had upon application at this office.

E. H. RUFFNER,
370 Captain of Engineers.

DIKE.
[At New Haven Harbor, Conn.]

U. S. ENGINEER OFFICE,
NEW LONDON, CONN., Dec. 23, 1882.

Sealed proposals, in triplicate, will be received at this office **until 11 o'clock A. M. on the 23d day of January, 1883**, for constructing a dike in New Haven Harbor, Conn., to be built partly of rip-rap stone, partly of piles and stone.

Specifications and blank forms for proposals and for guaranty will be sent on application to this office.

J. W. BARLOW,
370 Major of Engineers.

WATER-MAINS, ETC.
[At Wakefield, Mass.]

WAKEFIELD, MASS., January 10, 1883.

Sealed proposals for furnishing water-pipes, water-gates and fire-hydrants, and for laying and setting the same will be received by the Quannapowitt Water Company, of Wakefield, Mass., **until noon of Wednesday, January 24, 1883.**

Specifications and blanks will be furnished to bidders only on application to the engineer.

The right to reject any or all proposals is reserved.

CYRUS WAKEFIELD, President,
369 PERCY M. BLAKE, Engineer.

IRON CHAINS.
[Near Pittsburgh, Pa.]

U. S. ENGINEER OFFICE, 82 WEST THIRD ST.,
CINCINNATI, O., January 8, 1883.

Sealed proposals, in duplicate, will be received at this office **until 12 o'clock, noon, on Friday, the 16th day of February, 1883**, for furnishing and delivering at Davis Island Dam, on the Ohio River, five miles below Pittsburgh, Pa., about twenty-five thousand pounds of half-inch iron chains of the best quality. Specifications and all necessary information may be obtained on application to the undersigned or to Capt. F. A. Mahan, Corps of Engineers, P. O. Box 70, Pittsburgh, Pa.

WM. E. MERRILL,
371 Major of Engineers.

FIRE-ENGINE HOUSE.
[At Providence, R. I.]

OFFICE OF THE SUPT. OF PUBLIC BUILDINGS,
CITY HALL, PROVIDENCE, Dec. 28, 1882.

Sealed proposals, addressed to the undersigned, for the construction of a building, to be erected upon the lot owned by the city, fronting on North Main and Mill Streets, to be used as a fire station and ward room, will be received at the office of the Superintendent of Public Buildings, City Hall, **until 12 M., Friday, January 19th, 1883.**

Plans and specifications may be seen and information obtained at the office of Wm. R. Walker & Son, architects, No 27 Custom House Street.

The right will be reserved to reject any or all bids for the work.

JAMES MCNALLY,
369 Chairman Committee on City Property.

FURNITURE.
[At New York, N. Y., and Danville, Va.]

OFFICE OF THE SECRETARY,
TREASURY DEPARTMENT,
WASHINGTON, D. C., January 12, 1883.

Sealed proposals will be received at this office **until 1 o'clock, P. M., of Saturday, February 3, 1883**, for manufacturing, delivering, and placing in position, in complete working order, certain furniture for the United States Barge Office at New York, N. Y., and United States Court-House and Post-Office at Danville, Va.

Upon application to this office detailed information will be furnished to furniture manufacturers desiring to submit proposals.

The Department reserves the right to reject any or all bids, or parts of any bid, and to waive defects.

WM. F. FOLGER,
370 Secretary.

LUMBER.
[At Boston, Mass.]

CITY HALL, January 15, 1883.

Sealed proposals will be received at the office of the Clerk of Committees, City Hall, Boston, **until Monday, January 29, 1883, at 12 o'clock, noon**, for furnishing all the sawed spruce lumber required for the ordinary repairs of the bridges in Boston, which are in charge of the committee on bridges for the current year. The lumber furnished to be of the qualities known at Nos. 1 and 2, Boston Survey; to be of such dimensions and delivered at such bridges in such quantities and at such times as may be required or directed by the committee, or its duly authorized agent or agents.

Bids must state the price per 1,000 feet, delivered as required, and bonds will be required for the faithful performance of the contract.

Any further information can be obtained at the office of the City Engineer, City Hall.

The right to reject any and all bids is hereby reserved, and the acceptance of any is subject to the approval of the Board of Aldermen.

Proposals must be marked "Proposals for Lumber," and addressed to WILLIAM WOOLLEY,
369 Chairman Committee on Bridges.

PROPOSALS.

SCHOOL-HOUSE.
[At Home City, O.]

Sealed proposals will be received by the Board of Education of the Delhi Station School District No. 6, **until Monday, February 5, 12 o'clock, M.**, for the materials and labor required for building an eight-room school-house in Home City, Hamilton County, O., according to plans and specifications on file at the office of S. Hannaford, architect, Room 18, Palace Hotel Building, Cincinnati, and at the office of Dr. John Campbell, Home City.

Bids must be on blank forms, to be obtained at either office.

Each bid must contain the name of every person interested therein, accompanied by a sufficient guaranty by some disinterested person in a penalty equal to the amount of the bid, that if the bid is accepted the contract will be entered into, and the performance of it properly secured.

All bids must be addressed to R. H. Gibson, Clerk of the Board, at Delhi, O., or 174 Elm St., Cincinnati, O.

The right is reserved to reject any or all bids.

By order of the Board of Education.

370 R. H. GIBSON, Clerk.

COURT-HOUSE.
[At Caledonia, Minn.]

Sealed proposals will be received by the building committee of the County Commissioners of Houston County, Minnesota, **until March 21, 1883**, at the office of the Auditor, in Caledonia, for the construction of a stone court-house for said county, according to plans and specifications of same now on file at the Auditor's office, and at the office of the architects, C. G. Maybury & Son, Winona, Minn., who will give any further information desired.

No bids will be received except for the whole building complete as specified.

The successful bidder will be required to give bonds in the sum of $5,000.

The right to reject any and all bids is reserved.

By order of Building Committee.

372 E. K. BOVERUD, County Auditor.

LABOR AND MATERIAL.
[At Memphis, Tenn.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., January 15, 1883.

Sealed proposals will be received at this office **until 12 M., on the 15th day of February, 1883**, for all the labor and material required in the erection of marine hospital on lots A, B, and C, bounded by Walker, Armstrong and Coffee Sts., in Memphis, Tenn., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the superintendent.

JAS. G. HILL,
369 Supervising Architect.

HARDWARE.
[At St. Louis, Mo.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., January 11, 1883.

Sealed proposals will be received at this office **until 12 M. on the 3d day of February, 1883**, for furnishing and delivering at the Treasury Building, Washington, D. C., all the hardware required for the custom-house and post-office at St. Louis, Mo., in accordance with specification and schedule, copies of which and any additional information may be had on application at this office or the office of the superintendent.

JAS. G. HILL,
370 Supervising Architect.

WATER-WORKS.
[At Durango, Col.]

DURANGO, COL., December 28, 1882.

Sealed proposals for constructing water-works at this town will be received **until 12 M., February 1, 1883.** Proposals will be for two systems of water-works; gravity and turbine wheel with reservoir.

Specifications and details at office of City Engineer, Durango, Col.

The right to reject any and all bids is reserved by the town of Durango.

By order of the Board of Trustees.

371 F. W. BARNES, Clerk.

IRON BRIDGE.
[At Nashua, N. H.]

CITY CLERK'S OFFICE, NASHUA, N. H.

The committee on highways and bridges of the city of Nashua invite proposals for a new iron bridge across the Nashua River, on Canal St. The span is about 152′; a contemplated roadway of 22′, with sidewalks on both sides of the structure.

Committee reserve right to reject all bids. Proposals will be received **until February 1, 1883**, and should be addressed to

370 A. M. NORTON, Mayor.

GRANITE.
[Delaware Harbor.]

U. S. ENGINEER OFFICE, 1125 GIRARD ST.,
PHILADELPHIA, PA., January 11, 1883.

Sealed proposals, in triplicate, will be received at this office **until 12 o'clock, noon, of Saturday, January 27, 1883**, and opened immediately thereafter, for 8,000 tons of granite, to be used in the construction of the Delaware Breakwater Harbor.

For blank forms, specifications, etc., apply to this office.

G. WEITZEL,
369 Lt.-Col. of Engineers, U. S. A.

WATER-WORKS.
[At Danville, Ill.]

Proposals will be received at the office of the Water-Works Company, at Danville, Ill., **until 12 o'clock, noon, Tuesday, January 23, 1883**, for the machinery, boilers, buildings, stack, stand-pipe, pipe-laying, hydrants, valves, etc., in whole or in part, for the construction of the Danville Water-Works.

Plans and specifications can be found at the office of the Company, or will be mailed on application.

369 K. P. CORBYN, Engineer.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE general alarm excited by the burning of the Newhall House in Milwaukee, followed a few days later by a fatal fire in the Planters' Hotel in St. Louis, seems to have suggested to the New York Inspector of Buildings the propriety of ordering a new and strict examination of the hotels in that city, with a view to the rigid enforcement of the laws in regard to fire-escapes. One of the first structures examined was the Grand Central Hotel on Broadway, an old building, remodelled and enlarged some ten or twelve years ago. The house seems to have been favored for some time with the particular attention of the Fire Department, and about a year ago the Bureau of Buildings ordered extra stairways to be built at each end of the Broadway portion, the parlor windows to be cut down to the floor, and a balcony constructed outside of them, all of which was done, rather reluctantly, by the owner, who supposed that nothing more would be required of him. Unfortunately, the new inspection showed the advisability of further changes, and a fresh order was sent, expressed in the concise language of an official who means to be obeyed, and directing the owner forthwith to place some fifteen new iron balconies in specified positions on the Mercer-Street front of the building, with iron ladders, all in accordance with a printed specification accompanying the order; and in addition to this, to connect the new balconies with the halls by clearing away twenty-one intervening rooms, now used as bedrooms by the guests of the hotel. This fresh demand proved too much for the patience of the owner, who expressed his opinion concerning it to a *Tribune* reporter in vigorous language, but it is more than probable that the directions will be complied with, as Mr. Inspector Esterbrook possesses the virtue of determination in a remarkable degree, and public opinion has been sufficiently roused by the recent occurrences to sustain him in his well-meant efforts. There can be no question that, as between the hotel owner, who thinks that "if buildings get on fire, the people must look out for themselves," and Mr. Esterbrook, who conceives it to be his duty to exert his power to the utmost to protect people who cannot or do not use such caution as they might from the consequences of their inattention, the latter should have the warm support of the community. To those who live in places where the building laws, if any exist, are administered in such a way as to "make things pleasant all around," the uncompromising energy of Mr. Esterbrook's administration seems particularly admirable, and the commotion which his movements excite among property owners and holders of vested interests is the best possible evidence of the excellent work which he is accomplishing in behalf of the community which he serves so well.

THE New York *World* gives some sketches in relation to fires in theatres, suggested by the sad occurrence at Berditscheff, in Russian Poland, where three hundred persons lost their lives by the burning of a circus-building. In one hundred and three years, from 1777 to 1880, two hundred and fifty-two theatres were burned, with a loss of four thousand three hundred and seventy lives, and serious injury to three thousand three hundred and ninety-nine persons in addition. Since 1880 such catastrophes have become still more frequent and fatal than before, nearly eight hundred persons having been burned or suffocated in theatres within the last twenty-two months. Whether the future will witness a diminution in the number of these sad events it is hard to say, but notwithstanding the prolonged discussion of the subject, and the praiseworthy efforts which have been made to diminish the risk of fires in such buildings, it is very doubtful whether any material amelioration has been made in this respect in the construction of theatres. From the accounts which we find of new buildings of the kind it would seem that architects too often forget that the real agent of death in these conflagrations is not fire, but smoke, which if once allowed to gain access to the auditorium, usually suffocates all the persons in it long before the flames reach them. It has been said that the average length of time which elapses from the moment when the drop-curtain is penetrated by the fire until all life is extinct in the auditorium is five minutes, the longest period observed being eight minutes and the shortest three minutes; and remembering this we fear it must still be said that there is no existing theatre where a run for the nearest door at the instant that fire is discovered on the stage does not present the best, if not the only chance of safety. The construction of large ventilators over the stage, which has been proposed, but not yet very effectively carried out, is a step in the right direction, and this will, we hope, be supplemented before long by the total abolition of the central lustre in the auditorium, with the necessary ventilator over it, and the substitution of electric lights, or of some other contrivance which will permit the movement of air-currents from the auditorium toward and through the stage, and not, as is now the rule, from the stage into the auditorium. In addition to this the curtains, including both the drop-scene and green curtain, and all the scenery, should be of some absolutely fire-proof material, which will soon be discovered when a demand for it is felt, and to protect the wood-work of the stretchers and machinery, which cannot perhaps be dispensed with, automatic sprinklers, now coming into use for the purpose, should be scattered abundantly over the stage. In a theatre fulfilling these requisites, together with those of incombustible construction now generally recognized, an audience could sit through the evening in comfort and security, but the expectation of safety from anything short of this is likely to prove delusive.

THE telegraph brings the news of the death of the distinguished French artist Paul Gustave Doré. Doré was born in Strasbourg in 1832, and had been constantly before the public since 1848, when he was employed, although still a mere boy, to draw for the *Journal pour rire.* His earliest essays were remarkable for an imaginative force which might have placed him among the greatest of painters if circumstances had permitted its exercise in a different field; but such as they were, his little caricatures possessed a high degree of interest. It has been said of him that he was the only draughtsman who could give a comic expression to the front of a house, and the saying well indicates the power with which he made the most insignificant details subservient to his idea. A few years afterwards he had the misfortune to be employed to illustrate Balzac's Contes Drôlatiques, and although this was in one sense his most successful work, the atmosphere of fantastic and unfeeling extravagance in which it kept him for a time seems to have given his young mind a bias from which it never entirely recovered. That he would gladly have thrown off afterwards the perverted habit which had impressed itself upon him is indicated by many circumstances, and particularly by his choice of themes for his most important works, among them being a statue of "Love and Faith," and paintings of "Dante and Virgil in the Seventh Circle," and the "Christian Martyrs," besides many pictures of sacred history. That the merit of most of these is inadequate to the requirements of the subject must be acknowledged, but it is something in a painter to respect himself and his art so much as to prefer a pure and lofty inspiration, and even though Doré failed to accomplish all that he wished, he is likely to be remembered for something better than the grotesque work of his early years.

THE proprietor of the Bellevue Hotel, on the New Jersey coast, who threatened last summer to turn out of doors two of his guests, dangerously ill with typhoid fever, and was only persuaded to leave them in peace by a cash payment of five thousand dollars, has been called to account for his uncourteous conduct in the courts. The case has not at the present writing been concluded, but some curious testimony has been brought forward. It will be remembered that the pretext for the claim of money from the friends of the patients was that the occurrence of the disease had ruined the business of the hotel for the season, so that it was necessary to avoid further expense by closing it at once, and the five thousand dollars was represented to be a proper compensation for keeping the house open until the sufferers could be moved. The subsequent conduct of the landlord, however, unfortunately for his case, did not at all correspond to this theory, and far from closing the hotel on account of the fever, he continued business and received guests as usual until the end of the summer. Moreover, instead of behaving like a man who asked and received only a just recompense for his services and disbursements in the matter, it appeared that he was much elated over the transaction, and gave liquor to several of his servants, informing them that "he had just made five thousand dollars." In regard to the sanitary condition of the house, which was made the subject of an inspection by the Board of Health soon after the fever broke out, the engineer employed there at the time testified that slops were habitually thrown on the ground close to the rain-water cistern, so that he would not himself use the water from it, but kept a private supply of his own. Under the kitchen floor there was a pool of water, which ran through when the floor was scrubbed, and stood there stagnant. Before each of the two visits of the Board of Health he was notified to pump water into the tanks which supplied the water-closets, and did so, but at other times they were generally nearly or quite empty. One of the closets, in addition to the lack of water, was out of order, so that the water would not run in it even when the tanks were full, but he adroitly diverted the attention of the Board of Health from it by removing the handle of the door just before their visit, so that they could not get in, replacing it when they were gone. The indictment against the landlord, based upon all these circumstances, was for "robbery, riot, extortion, assault, and maintenance of a nuisance." Whether they will all be sustained is doubtful, but no one will be sorry to see conduct which was discourteous and unfeeling, if not dishonest, properly rebuked.

AN interesting exhibition of manufactured products from foreign countries is to be held in the summer of this year in Boston under the auspices of an association of well-known gentlemen. A lease of the large building of the Massachusetts Charitable Mechanic Association has been secured, and the arrangements will be in excellent hands. Steps have been taken to obtain the coöperation of American consuls abroad, and the characteristic industries of each nation will be well represented. In many respects such a collection will be more valuable and instructive than the gigantic international exhibitions which occur about once in a decade. Most visitors to the Centennial Exposition at Philadelphia probably recall the objects of unaccustomed form or material, such as the Russian silverware, the Kensington embroideries, the Japanese bronzes and furniture, and the English ceramics, much more vividly than the familiar articles of home production, and to many of them the idea has perhaps occurred that one-tenth of the objects shown could have been brought together into a collection which would, to the general public, have possessed about nine-tenths of the interest of the entire exposition. Some notion of this sort appears to have prevailed among the managers of the Boston exhibition, for a special effort is to be made to display Oriental products to advantage. It is said that the Chinese and Japanese exhibits at the recent Melbourne fair much surpassed those sent to Philadelphia, and that they will probably be sent to Boston intact; and arrangements are in progress for a very full representation of Indian, Persian and Turkish manufactures. These arrangements we trust may be successful. No one who has not seen a first-rate collection of Indian goods can imagine the splendid coloring and unapproachable magnificence of material which they alone present, while Persian manufactures are, with the exception of a few glazed tiles and bits of bric-à-brac, practically unknown in this country.

THE Louvre is to be enriched with a collection of great value, although of trifling cost, in the shape of a systematized series of photographs of all the important buildings in the world, as well as of other interesting objects of art. Any one who has tried to form a representative collection of this kind, including perhaps only the buildings of a given style, or subdivision of a style, will appreciate the importance of this complete series, which will, it is to be hoped, be duplicated for the benefit of other museums. Hundreds of the most interesting structures in the world have never been photographed at all, and the list of those which are accessible in this way to the ordinary purchaser is extremely small. Another innovation at the Louvre is said to be the appointment of travelling conservators, who will be commissioned to visit all important exhibitions of works of art throughout the world, and in various ways keep themselves acquainted with the picture market, follow the transfers of important works, and secure a record of their commercial value.

THE great competition of designs for the enlargement of the Sorbonne at Paris has been decided in favor of M. Henri Nénot, the distinguished winner of the first prize in the competition for the Italian national monument to King Victor Emmanuel. MM. Ballu, Formigé, Vaudoyer, and Hermant obtained lesser prizes. The sum to be expended on the new buildings is about twelve hundred thousand dollars, so that M. Nénot will make his entry into professional life under very favorable circumstances. Two other competitions have been closed, both of them for works of sculpture, one being for the statue of Etienne Marcel, to be erected near the Hôtel de Ville, and the other for the statue of Ledru-Rollin. Seventy-five competitors entered the lists for the Marcel statue, so that the subject seems to have been a very inspiring one. In the competition for the Sorbonne buildings, which was restricted to French architects, only twenty-seven designs were submitted: of these seven were thrown out on account of not comprising all the required drawings, and among the remaining twenty ten premiums were awarded, making one to every second competitor. Considering the importance of the commission to be won, it is remarkable that the number of competing architects should have been so small. The jury was composed of the most eminent practitioners in France, including MM. Alphand, Vaudremer, Daumet, Coquart, Brune, Garnier, Ancelet, Ginain and Diet, the six last named having been elected by the ballots of the competitors.

THE next decade seems likely to be one memorable for the great engineering works undertaken in nearly all the civilized countries of the world. To say nothing of the Panama Canal, the other railway, canal, tunnel, and bridge schemes now under consideration would make the age remarkable. In France a vast canal is projected, to connect the Atlantic at Bordeaux with the Mediterranean. A subterranean telegraph cable is now in process of construction, to extend from Paris to Marseilles, and a great number of new railways have been proposed, the total length being about fourteen thousand miles, while nearly thirty-five hundred are already in process of construction. In England the great Manchester Ship Canal has been definitely decided upon, and the manufacturing cities of Preston and Stoke-upon-Trent are about to take measures for putting themselves in direct communication with the sea; while the number of new railway lines projected is far in excess of that for any recent year. In Scotland, the Frith of Forth, or Queens-ferry bridge, with its two enormous spans, will attract much attention among engineers. In Germany, a comprehensive plan has been proposed for connecting all the great rivers of Central Europe by a system of canals, so that vessels can sail without interruption, except by locks, from the Adriatic to the Baltic, and from the Black Sea to the German Ocean. Besides this, communication is intended to be opened between the various portions of the inland country by cross canals, connecting the Danube and the Rhine, the Danube and the Elbe, and the Danube and the Oder. A separate scheme much favored in Germany, and if we are not mistaken already in train for carrying into effect, is for a ship-canal across the neck of the Danish peninsula, shortening the distance between the North Sea and the Baltic, and avoiding the necessity for sending ships of war to and from Russia and Germany past the guns of the Danish forts at Elsinore.

PAPERS ON PERSPECTIVE.—XVIII.

OTHER SYSTEMS AND METHODS.

In the processes hitherto described every line has been regarded as a portion of an infinitely long line tending towards its vanishing-point, and every surface as a portion of an infinite plane extending to its trace, or horizon; and it is by determining the position of these vanishing-points and traces that the position of the perspective representations of these lines and surfaces has been fixed. This way of looking at the subject involves a comprehensive survey of the phenomena in question, and leads to a proper understanding of their relations. The processes deduced from this study are also generally convenient in practice; for, though some of the vanishing-points are generally somewhat remote, still the space required for drawings executed upon the small scale commonly employed is not greater than can usually be afforded.

Before dismissing the subject, however, it is proper to consider some other methods of obtaining the same results, based upon the consideration of these same phenomena, and involving a more extended application of some of the principles already considered — methods which under certain conditions offer considerable advantages.

322. Several of these special methods are illustrated in Plate XX. In all of them the consideration of vanishing-points and traces is more or less dispensed with, the lines to be represented being considered merely as finite lines lying between two points, the immediate object of the processes employed being to fix the perspective of these points. In some of these methods the abandonment of the outlying vanishing-points leads to so great a reduction of the space required for making the drawing that the work is performed almost entirely within the limits of the picture itself. In executing large works, such as scene paintings or mural decorations, this is, obviously, of great convenience.

THE METHOD OF DIRECT PROJECTION.

323. In this method no use at all is made of vanishing-points, and no reference is had to any of the phenomena of parallel lines that are represented by means of them.

The object to be represented is carefully drawn, both in plan and in side elevation, and the plane of the picture, seen *edgewise* or in section, and the station-point are shown. By drawing lines, representing the visual rays, from every point in the object to the station-point, first on the plan and then in the elevation, and noting their intersection with the plane of the picture, the horizontal and vertical position of the perspective of every point may be ascertained, and a representation of the object obtained by drawing lines connecting the points.

Figure 89 illustrates this method, giving at *a*, *b*, and *c*, the plan of a cross, set obliquely, and two elevations, both of which are necessary, as neither one of them exhibits all the points visible from the station-point, S, in front. Lines representing the visual rays are drawn, both in plan and in both elevations, from all the visible points to the point S, and the points where they pierce the plane of the picture, *p p*, indicated. These points, being transferred to the side and bottom lines of the figure, 89, *d*, suffice to determine the position of each point in perspective.

This kind of projection, in which the lines of projection converge to a point, instead of being parallel as in plans and elevations, is called conical projection, as distinguished from orthographic.

THE MIXED OR COMMON METHOD.

324. The method of direct projection is seldom used to determine vertical dimensions — that is to say, to fix the position of horizontal lines — the labor of constructing two oblique elevations being intolerable; but it is very generally employed for the determination of horizontal dimensions; that is, to fix the position of vertical lines, the length of vertical lines being determined by means of lines of vertical measures and vanishing-points on the horizon.

Figure 90 illustrates the application of this mixed method to the subject of the previous figure. The vertical lines are drawn as in Figure 89, *d*, their position being taken from the geometrical plan at *a*, by direct projection. Their length is determined by setting off the real heights, as given by the elevation along-side, on a line of vertical measures, *v v*, taken where the plane of the front of the cross intersects the plane of the picture. This is fixed by the point *m*, in Figure 89, *a*. Figure 89 also serves to determine the vanishing-points V^R and V^L, and the corresponding points-of-distance, D^R and D^L.

325. Though this method is deficient in scientific unity, an entirely different principle being employed for horizontal dimensions from that used to determine vertical dimensions, it is often very convenient in practice, especially when, as is frequently the case with buildings, a carefully drawn ground-plan, prepared for other purposes, can be taken advantage of. This is still the process most commonly employed by architectural draughtsmen for the determination at least of the main lines of their work. Points-of-distance, points of measures, and the vanishing-points of inclined lines, are employed, if employed at all, only as auxiliaries and alternative devices.

326. But the employment of the perspective plan to determine horizontal distances, and thus fix the position of the vertical lines of a perspective drawing, as has been done in the previous chapters, is altogether preferred by the best and most recent writers, and by the best-informed draughtsmen. It has the signal advantage of avoiding the confusion and error that necessarily attend the multiplication of points of intersection distributed along a single line. Even in the figure just given, simple as it is, we find in 89, *a*, a dozen points crowded together upon the line *p p*. It is not easy, in transferring them to Figure 90, to keep clearly in mind which is which — which indicates a point at the bottom, which a point on the top, which belongs to the front plane and which to the back. In the perspective plan, on the contrary, Figure 91, every point is significant; there is no confusion, and the relations of all the parts being clearly exhibited, there is much less danger of trivial inaccuracies than in a blind and merely mechanical procedure. Moreover, if the perspective plan itself becomes too crowded with details, it is practicable to make a second or a third, as has already been done in Plate III. In the case of high buildings it is usual to make a separate perspective plan for each story, those of the upper stories being drawn above them, as those of the lower stories are drawn below. These plans are always perfectly intelligible and serviceable after any lapse of time, and, as has been said, may conveniently be made on separate strips of paper, thus saving the drawing itself from disfigurement, and, indeed, protecting it from injury. These strips of paper with the plans upon them can then be preserved, and in case a second drawing for any reason has to be made, half the labor of making it will have been saved.

327. Other and incidental advantages of this method are the great facilities it offers for designing in perspective, for working up a perspective drawing from rough sketches, and altering and adding to it at will, studying the effect of such changes as may be suggested by taste or convenience. It is also to be observed that the perspective plan takes up less room than the orthographic plan, with its system of visual rays directed towards the station-point, and this is sometimes a consideration of some importance.

328. The reason why the perspective plan is so little used, although the theory of points-of-distance on which it is based is perfectly familiar, is that unless this plan is sunk considerably below the picture the desired points are not very accurately ascertained, the lines whose intersections determine them cutting each other at an acute angle. Sinking the plan, however, as is done in Figure 90 and elsewhere, entirely obviates this, and has the advantage, not only of enabling one to draw it on a separate paper and preserve it for future use, as has just been suggested, but of keeping the picture itself free from construction lines.

THE METHOD OF CO-ORDINATES.

329. The method of co-ordinates applies the principles of parallel perspective, as set forth in Chapter VII, to the solution of every class of problems. Lines parallel and perpendicular to the picture are treated as is usual in that system. Lines inclined to the picture are determined, as in the method of direct projection, by ascertaining the perspective of the points between which they lie, their vanishing-points being neglected. The position of a point in space being known, the three dimensions that determine its position can easily be put into perspective, two of them being taken parallel to the picture, and the third perpendicular to it; and, the perspective of every point being thus ascertained, the lines lying between them are easily drawn.

In speaking of these three directions, at right angles to each other, it is convenient, just as we call the vertical dimension height, to speak of the horizontal dimension parallel to the picture as width or breadth, and of the other horizontal dimensions, perpendicular to the picture and parallel to the axis, as depth.

330. Figure 92 exhibits the application of this method to the same subject as that by which the other methods just mentioned were illustrated. The eye being supposed to be about three inches from the paper, the point-of-distance would be three inches from C, the centre of the picture. The point of half-distance is accordingly set an inch and a half off, at $D\frac{1}{2}$, and the *perpendicular* dimensions are laid off upon the ground-line of the perspective plan in Figure 92, *b*, at half the scale of the orthographic plan above (Figure 92, *a*), from which they are taken. (142.)

In Figure 92, *c*, the vertical dimensions, as given by the elevation in Figure 90, are laid off upon the scale of heights erected at *g*. Horizontal lines drawn from the points thus ascertained to the centre, C, and vertical lines drawn from the points previously ascertained upon the scale of depths, drawn from *g* to C, in the plan below, determine by their intersection the height above the ground-plane and the distance behind the plane of the picture of every point in the object to be represented. This enables one, if he pleases to do so, to construct a perspective of the side elevation, as

is done in the figure, just as the perspective of the plan is constructed. In fact, Figure 92, *c*, is the perspective of Figure 89, *b*, just as Figure 92, *b*, is the perspective of Figure 89, *a*. The perspective plan and elevation being both given, the perspective of the object is easily constructed.

It is sometimes convenient to construct this perspective elevation in a vertical plane not perpendicular to the picture; a plane, that is, whose horizontal elements are directed to some other point of the horizon than the centre, C. This is shown in Figure 92, *d*. In this case points upon a new line of depths are taken across from the line *g* C.

331. All this, though simple in theory, is laborious in practice, as the application of general methods to special problems is apt to be. In most cases it is not worth while to give up the facility and accuracy afforded by the use of vanishing-points for this tiresome and roundabout process; but when the object to be drawn is irregular in shape, or bounded by curved lines, so that it has to be put in by points at any rate, the method of rectangular co-ordinates, according to parallel perspective, best meets the case. Even when such objects occur in a drawing made in angular perspective it is often convenient to employ it. When, finally, the scale of the drawing is so large, or, what comes to the same thing, the space to work in is so small, that the vanishing-points are inaccessible, this method is of great service. By employing points of half-distance, or quarter-distance, etc., the necessary constructions can generally be confined within the limits of the picture itself.

332. The most common application of the principle of co-ordinates is to the determination of the size of miscellaneous objects, such as trees, animals, or human figures in landscapes. A vertical scale being established in the plane of the picture, resting upon the ground-line, lines converging to any convenient point on the horizon suffice to show how large any object, a human figure, for instance, should be drawn in any part of the picture.

This use of a scale of heights is illustrated in Figure 93. The figures are supposed to be all of the same height as the one in the immediate foreground. The scale of heights, on the left, shows how tall such a figure will appear at every point of the horizontal plane between the ground-line and the horizon. The position of such a figure above or below that plane will not of course affect its apparent size. The man in the balcony, on the right, for instance, is drawn just as tall as the man on the platform beneath, and the persons upon the inclined plane descending to the water are of the same height as those upon the pavement alongside.

The size of the different vessels is determined in a similar way.

333. It is worth while here to point out that though points of half-distance, quarter-distance, etc., in parallel perspective, do not serve, as do points-of-distance, as vanishing-points of lines of 45°, such lines can nevertheless easily be drawn through any point by their aid.

Let *a* and *b* in Figure 94 be two points through which it is desired to draw lines making 45° with the axis and with the ground-line, the centre, C, and the point of half-distance, $D\frac{1}{2}$ being given: By drawing through these points lines directed towards C and $D\frac{1}{2}$, crossing them with a line parallel to the horizon, and then doubling upon this line the distance intercepted, lines may be drawn which are obviously directed towards D-V^{x}.

If the point of one-third-distance is given, the intercepted portion must be trebled, as at *c*, or quadrupled, as at *d*, if the point of quarter-distance is used.

It is hardly necessary to explain how a square can be erected on a given line parallel to the ground-line, as is shown in Figure 94, using points of half, third, and quarter distance.

THE METHOD OF SQUARES.

334. The processes of the method of co-ordinates may be much simplified, especially in the case of objects irregular in plan, by adopting the device of *squaring*, commonly used by draughtsmen to assist them in copying the outlines of drawings, especially such as are to be copied on an enlarged or reduced scale. It consists in first covering the drawing to be copied with a net-work of lines, then reproducing this net-work at the scale required, and finally in filling in, by the eye, the portion of the drawing included in each of the reticulations.

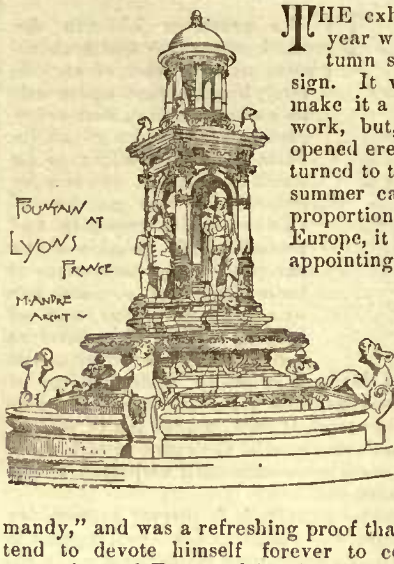
335. The method of squares applies a similar procedure to the putting into perspective of a complicated perspective plan. A net-work of lines being first drawn over the plan in question, its perspective representation is easily drawn in parallel perspective. The details of the plan can then be filled in with sufficient accuracy, and the vertical dimensions obtained from a scale of heights.

Figure 96 illustrates this procedure, *a* being the orthographic plan, *squared*, *b* the perspective plan, and *c* the drawing.

The figure does not show how the heights are obtained. They may be obtained either by *squaring* a side elevation and putting it in perspective, after the manner of Figure 92, *c*, or by erecting lines of vertical measures at convenient points in the plane of the picture, as in Figure 90.

336. If a sunk perspective plan is used, as in the drawing, the outlines of the plan in the picture can most easily be found by the use of proportional dividers, the distances of the corresponding points from the horizon being proportional.

PICTURES OF THE SEASON IN NEW YORK. — I. THE EXHIBITIONS.



THE exhibition season opened this year with a new departure—an autumn show at the Academy of Design. It was proposed, I believe, to make it a collection of fresh summer work, but, perhaps because it was opened ere most of our artists had returned to town with the fruits of their summer campaign, and while a large proportion of them were still absent in Europe, it turned out to be a most disappointing and uninteresting collection of old work, much of it very poor in quality, and some of it looking like the very refuse of the studios. Only a few pictures deserved any attention; chief among them being a large canvas by Mr. Bridgman from the recent *Salon*. It was called, "Planting Rape in Normandy," and was a refreshing proof that Mr. Bridgman does not intend to devote himself forever to conventional, semi-theatrical transcripts of Eastern life. It was singular and good in composition, with a steep hill-side in the middle distance, and at its foot men ploughing and women planting seeds in the furrows. It was full of light and atmosphere, and broad in handling, in these respects agreeing more with the studies Mr. Bridgman showed two years ago in New York than with the majority of his larger pictures. In tone it was a little too dark for the sunlight effect desired, yet that effect was well suggested none the less, and in color it was sober and good.

At about the same time the American Art Gallery on Madison Square—which has passed into new hands, and been altered for the better, so that it is now more than ever the best room in the city for showing pictures—was opened with a collection of sketches and studies. Here we found the freshness and novelty that we had looked for in vain at the Academy. The works were mostly small in size, and while the first favorable impression caused by their freedom and freshness was not in all cases afterwards sustained by the finding of much artistic excellence of sentiment or idea, yet the workmanship was almost always good. The pictures were, moreover, evidently true studies, and not things manufactured in the studio to bear such an appearance. Among the best were some really beautiful figures by the two young Morans; Mr. Tracy's studies of dogs; Miss Greatorex's flowers in water-color; Mr. Vedder's sketch of the burning Park Theatre; a landscape by Mr. Alden Weir, and a couple of heads by Mr. Carroll Beckwith. Slight, shallow and commonplace in feeling as were some of the numbers, there was hardly one in the room which showed the old, hard, conventional, uninstructed modes of working to which our artists were wedded not so many years ago.

The Brooklyn Exhibition I did not see myself, but published criticisms, and an inspection of the catalogue showed that it was, as usual, chiefly made up of pictures that had already been exhibited in other places. Prominent on the list was a fine portrait called "Ethel," by Mr. Beckwith, which I saw last year in Philadelphia, and which he ought now to exhibit in New York, as it gives a far better idea of his talent than any work he has lately shown us.

The Black-and-White Exhibition of the Salmagundi Club in December was extremely good. But few etchings were shown, as the Etching Club reserves its force for its own exhibition which, as was the case last year, will occur in conjunction with that of the Water-Color Society. There were also fewer wood-engravings than one could have wished. Chief among those that were shown was a beautiful cut by Mr. Closson of a child standing in a white night-dress on a great fur rug. It was not only noteworthy as a good example of Mr. Closson's handiwork, but as being a reproduction of a painting by his own hand, and, chiefly, as being the first wood-cut one of our men has ventured to publish as an independent work of art. There is no reason why this art, at the point it has now reached, should be inevitably tied to literature any more than the same should be the case with etching or with steel-engraving. It is to be hoped that Mr. Closson's cut—which is published by Mr. Eastman Chase, of Boston,—may be followed by numerous issues of a similar sort. Wood-engraving is supposed to be especially well understood and beloved by our public, and we should be ready to purchase fine cuts for their own interest alone, especially as their price is so far below that of other reproductive works.

The great variety of methods adopted for black-and-white work in this exhibition, and their careful manipulation showed what a hold monochromatic production has taken upon our men. Oil, Crayon, Charcoal, Water-Color, and sometimes a mixture of two of these processes are all widely practised, and as such different effects can be obtained with each, the critic is not inclined to cavil, even at the process of black-and-white oils which has so often been pronounced "illegitimate." The chief objection to it is that no scale which runs

logically from black to white in oil paints can be agreeable to the eye, the intermediate grays being distressingly cold and hard; but this defect is often obviated by using a more brownish scale, and then, if the artist has a true eye for the relations of his scale, there is little fault to find. Unfortunately some men, not content with the effects of a true monochromatic scale, secure a cheap variety and effectiveness by using two scales in the same picture. This was the case, for example, with a landscape by Mr. Tryon—a very clever painter, by the way—where the ground was treated in a brownish scale, and the sky with tones of gray. Nothing could have been more false as art, and it is to be hoped that no more such experiments will be made by men who can do good work when on the proper track.

Mr. Shirlaw sent a number of crayon sketches of Italian subjects, usually graceful in line and full of sentiment. Especially pleasing was a group of Italian women around a fountain. Mr. Currier sent from Munich a number of charcoal studies of trees that were extremely summary in treatment but massive and truthful in effect. Even without his gorgeous color he is a most suggestive and individual sketcher; but I wonder much — and I heard the wonder echoed by his Munich friends last summer—whether he does not mean ever to display his incontestable talent in a completer way.

Many good landscapes were exhibited that cannot here be cited. But a word must be given to some monotypes by Mr. Charles Walker which were far better than most of those he produced last year when the process first attracted notice. A large one showing a stormy sea, with breakers in the foreground was extremely fine, both in drawing and in the effect of motion and liquidity given to the waves. It was difficult to see how this last-named quality could have been better expressed by any other way of working. An interesting feature of the exhibition was a group of drawings in the corridor—the originals of the designs so familiar through the pages of *Harper's Christmas*. They were most of them very well done, but their chief value was when put into mental comparison with the engravings made after them. The result was an increase of the pride we already felt in our engravers, and their complete justification from the heaviest charges brought against them by unfriendly critics. It has been said for long in some quarters that they do not know how to "draw with the graver," or to properly use "the line" in expressing their intended effects; but here, while we saw a charcoal half-figure by Mr. Chase, which had been reproduced with Chinese fidelity by Mr. Juengling in work where such a thing as a real line could not be seen, near it was a sea view by Mr. Quartley which the same engraver had translated into the purest line work, immensely improving it in the process by the addition of far more accurate drawing than could be found in the original. And Mr. Cole had found most beautiful line work for his duplicate of Mr. Dielman's "Girl I Know," which was executed in delicate water-color washes; but the chief example of wood-engraving skill was to be found in Mr. Cole's version of Mr. Vedder's "Samson." As so often before Mr. Vedder had had a good idea, but had been unable to give it proper shape. His drawing was weak and poor, and not true in tone, but Mr. Cole's drawing *was* true in tone, and was drawn firmly and artistically. If one had been offered the choice between the original and one of the wood-cuts from it, there could have been no hesitation in choosing the latter.

The exhibition of the Boston Artists now open at the American Art Gallery has won favorable criticisms on every side. Twenty artists are represented, each usually by several examples. Mr. Fuller, as was to be expected, carries off the laurels; but I cannot yet speak of the collection in detail as I have had but a glimpse of its contents.

The arrival of Dr. Haden was followed by a reception at the Union League Club, when many of his etchings as well as a fine collection of American plates were put on view. Dr. Haden is enthusiastic over our work, and New York was enthusiastic over Dr. Haden's. A little later Mr. Keppel placed on view, in his rooms on Sixteenth Street, the largest collection of Haden's etchings that has ever been got together in any place. It was all but complete, and I need hardly say, of the very greatest interest. One was charmed to be guided, moreover, by a catalogue annotated by the etcher himself, and giving his own criticisms on his work. Even when one does not agree with an artist's judgment of his several productions, it is a great guide to one's own decisions, and a great help to one's comprehension of his activity as a whole, to see how he feels and criticises. The collection numbered over one hundred and fifty prints, some of them absolutely and many of them almost unique. I believe it is no secret that it has been sold *en bloc* to Mr. Claghorn, of Philadelphia, only such examples to be subtracted as were already in his possession. I cannot here speak at length of these etchings, which are so familiar by name if in no other way to all lovers of the art. Dr. Haden deserves, if criticised at all, to have a chapter to himself. The opposition and anger excited in so many minds by his recent utterances on the subject of other methods of engraving should not, by the way, enter into a consideration of his work, as they do not militate against our intense enjoyment of its versatility, its freshness, its power and individuality. There is no living landscape painter to compare with him, taking his work as a whole, and it is doubtful whether there ever was even in the days when his master, Rembrandt, was still on earth.

The Water-Color Exhibition and the Artist's Fund open on the 29th inst., and we shall soon after have the spring collections which promise to be of unusual interest. M. G. VAN RENSSELAER.

THE HOUSE THAT JILL BUILT.[1]

AN uncommonly gifted woman was Jill, what our mothers would call a notable woman, practical, well balanced, and, if prejudiced at all, with prejudices having a foundation in common sense: just the woman an architect would like to build a house for, especially if she happened to be his own wife. We believe that it can hardly be the most pleasant of occupations for an architect to build a house for his own wife, who may be supposed to have absorbed, by endosmosis or otherwise, rather more rigid notions of architectural proprieties and possibilities and a greater knack of presenting her arguments plausibly than the ordinary female client usually achieves. Still, we presume many of our subscribers have built and are living in their own houses, and we think it would afford a good deal of gratification to others if they should offer them to us to be published as a series of illustrations of the homes of American architects.

But to return to our heroine. Amongst other wedding gifts Jill finds a check from her father which is to pay for a new house, so that the newly-married couple find their most interesting occupation during their honey-moon trip in examining such houses as attract their notice, not only externally but, after due explanation, internally, a possibility which the confidence every householder has in the infallibility of his own taste and judgment throws within their reach. Of course none of them suits the critical female visitor. On their return home to the house that Jack built as a home for his bride, but in which Jill utterly refuses to live except during the time required for building her own house, and which throughout the preliminary discussion serves as the *exemplum horribile* to point the moral of all her arguments, a large number of letters are found awaiting them from friends who have built their own faultless houses and are consequently in a position to offer advice. These infallible recipes Jill epitomizes as follows:—

"It appears, Jack, my dear, to be absolutely indispensable to our future happiness that the house shall front north, south, east and west. We must not have large halls to keep warm in cold weather, and we *must* have large halls for style. The stories must not be less than eleven nor more than nine feet high. It must be carpeted throughout, and all the floors must be bare. It must be warmed by steam and hot-water, and furnaces, and fireplaces, and base-burners, and coal grates. The walls of the rooms must be calcimined, painted, frescoed and papered; they must be dyed in the mortar, finished with leather, with tiles, with tapestry and with solid wood panels. There must be blinds—outside blinds, awnings, inside shutters, rolling blinds, Venetian shades, and no blinds at all. There must be wide low-roofed piazzas all around the house, so that we can live out of doors in summer, and on no account must the sun be excluded from the windows of the first story by piazza roofs. At least eight patent sanitary plumbing articles, and as many cooking ranges, are each the only one safe and fit to be used. The house must be high and low. It must be of bricks, wood and stone, separately and in combination; it must be Queen Anne, Gothic, French, Japanesque and classic American, and it must be painted all the colors of an autumn landscape."

Jack consoles his spouse with the suggestion that all this advice has not to be paid for. One adviser, however, is more interested than the others, and aunt Mellville pertinaciously sends letters of advice and sets of drawings which she borrows from friendly householders and some architects who are not unwilling to play for a new "job" in this way. These designs Jill treats with more consideration than the letters of her other advisers, and they serve to make the illustrations in the book before us the more interesting. How much the advice given affects her does not appear, but when the time comes for decision Jill shows her force of character by "roughing-out," without apparent effort, the plan of her future house, which all the skill of the architect is not able to improve on in any essential feature. Her good sense is shown still more in employing an architect and in speaking as she often does of his functions with an unusual degree of insight: for instance in speaking of the exterior of the house she says: "In that part of the undertaking we are bound to believe that the architect is wiser than we, and must accept in all humility what he decrees." She also listens with an uncommon complaisance to the lectures and advice of the architect, and her temper, which is as uneven as that of most women of genius, is not ruffled by this plain statement of the "rights of the matter."

"There is often a misunderstanding between architect and client, and I wish to avoid it in the present case by saying at the outset that while there are many things which, in my opinion, should be referred to you, I am ready to decide them for you if you wish me to do so, but even in such cases I prefer to set before you the arguments *pro* and *con*, after which, if you still desire it, I shall accept the arbitration. This is not a rule that works both ways or applies universally, for while referring to you matters relating to use and expenditure, and at the same time standing ready to decide them for you, I cannot promise to accept your advice in matters of construction and design. I trust I have not yet reached the fossiliferous state of mind that prevents my listening with sincere respect to candid suggestions even from those who are not fairly competent to give advice, but on these points you must not expect me to follow your taste and judgment in opposition to my own,

[1] *The House that Jill built after Jack's had proved a Failure.* A Book on Home Architecture, with illustrations. By E. C. Gardner. "Our Continent" Library, New York: Fords, Howard & Hulbert. 1882.

even if you do pay the bills. When your physician prescribes arsenic and you inform him that you shall give it to your poodle and take strychnine instead, he will doubtless infer that his services are no longer desired; he will know that while he might be able to kill you, he could not hope to cure you. Patients have rights which physicians are bound to respect, but the right to commit suicide, and ruin the physician's reputation, is not among them. The relations of client and architect are similar."

This little book is even more entertaining and suggestive than Mr. Gardner's previous books have been, and the scheme of its construction is a refreshing change from the somewhat antiquated fashion of imparting instruction by the publication of a fictitious correspondence. Although Jill and her architect do talk now and then "like a book," Jack's ideas are both human and lively, and the book has an interest for the mere story-reader in the little romance which is skillfully introduced in the love-making of the ultra-practical Jim and the super-æsthetic Bessie.

The illustrations are abundant, suggestive, and, as a rule, good, but the tail-pieces are a little too —— archaic.

We think Mr. Tourgée made a mistake in writing an introduction to the book, particularly such an introduction. Mr. Gardner does not stand in need of any "endorsement," and the public distinctly objects to being bullied as to the opinion which it is to form on the books it reads.

THE ILLUSTRATIONS.

MANTELS FOR T. B. HANDY, ESQ., CLIFTON, CINCINNATI, O. MR. J. W. MCLAUGHLIN, ARCHITECT, CINCINNATI, O.

COMPETITIVE DESIGN FOR A $3,000-HOUSE. SUBMITTED BY "*Try.*"

Should any one of our non-professional readers be tempted to build such a house as this for himself, we shall be pleased to further his interests by putting him into communication with the author.

PERSPECTIVE PLATE XX. — MISCELLANEOUS METHODS.

For description see article elsewhere in this issue.

THE $3,000-HOUSE COMPETITION — II.

SKELETON SPECIFICATION.

MASON.

Excavating: — Make all necessary excavations for area of entire building, trenches for footings, foundation walls, etc.

Make excavations 6″ larger on each side than size of walls, and leave open until walls are well set and dry. Then refill with sand to within one foot of surface; rest to be filled with clay if handy and pitched away from building and covered with soil.

All outside walls to be of limestone (footings firmly bedded in sand), of thickness shown on plans, and laid in good lime mortar. To be laid true and smoothed with full flush joints.

Pointing: — Portions above ground to have tuck-pointed joints on face.

Bricks: — All brick to be common, of good quality, chimney-tops to be selected out.

Inside walls: — Inside walls to be 8″ thick, carried three courses below cellar floor; to be footed out to 12″ and carried up to floor.

Cellar floor: — Cellar graded to an even surface, and laid with sidewalk-brick in sand.

Chimneys: — Chimneys to have flues 8″ x 12″ thoroughly pargetted.

Thimbles: — To have five sheet-iron pipe-connections 7″ in diameter with tin caps.

Lath: — Lath walls and ceilings of 1st and 2d stories with sound, soft, pine lath, with four nailings to each lath.

Plaster: — To be made of fresh-burned lime slacked at least six days before using, run through a sieve and mixed with proper quantity of clear, sharp lake-sand and lime.

The first coat to be thoroughly scratched and when dry the second coat to be finished to a true surface, well worked and floated.

Cove, etc.: — Plaster in cove and gables to be laid on wire lath; in cove to be run to a true surface with templet and set with bottle ends as directed.

Plaster to have sawdust instead of hair; to be ½ American cement, and surface to be pebble-dashed.

CARPENTER.

Lumber to be seasoned, second, clear soft pine. Joist 2″ x 10″; studs, 2″ x 4″; rafters on pitch, 2″ x 4″; decks, 2″ x 6″; ceiling joist, 2″ x 4″ and 2″ x 6″; plates and sills, double, 2″ x 4″; double joist under partitions where needed; three joists over Parlor bay. Joists 16″ on centres; studs same; and double at all openings. Joist over and under Parlor to have one line of bridging. Trimmers and headers to be double. Sills well spiked to joist and plates.

Lining Boards: — Cover outside studs with seasoned, planed and matched furring, nailed to each stud, and cover with one thickness of building paper, with lapped joints.

Corner Boards, Belts, etc., of "A" select 1½ stuff.

Siding: — Cover outside of first story with clean, soft pine siding laid 5″ to weather.

Shingles: — Cover second story with clear, white-pine shingles laid 6″ to the weather; and to have two belts of cut shingles on front as shown, to be 4″ wide. Roofs to be laid with 4½″ to weather.

Deck: — To have tar and gravel roof to pitch to rear. For cornices and outside finish see details.

Gutters: — Gutters to be run on rear and left-hand elevations in manner shown and to have proper pitch; to be made of ⅞″ pine.

Floors: — Floors to be of ⅞″ pine laid double in both stories.

Windows: — Basement, plank frames with hinges. Parlor, plank frames with hinges. Front Chamber, plank frames with hinges. China Closet, Pantry, Hall-Closet and Servant's Room, sliding sash, plank frames. All others box frames.

Second-story windows except in front and hall to have no outside casing.

Sashes: — Sashes to be 1⅜″ thick. Basement sashes to swing up to joist and fasten with wooden latch.

Window-Fixtures: — Windows of Parlor and Front Chambers to swing out. To have japanned butts and Berlin bronze catches and holders. Windows in box-frames to have Berlin bronze fasts, hemp cord, and iron weights. Other windows to have sliding catches of iron.

Doors: — Basement frames to be of 2″ plank; doors for same to be battened.

First Story to be 1¼″; doors for same to be 1⅜″ thick, with flush mouldings: see detail of front door. To have five panels to a door.

Second-story doors to be 1⅜″ thick stock with ogee stiles and rails; frames 1¼″.

Front Door to be 1¾″, 3′ 0″ x 7′ 6″ six-panelled, pine as shown.

Basement and second story doors to be 7′ 0″ high. First story 7′ 6″ high. All closet doors to be 2′ 6″; all others 2′ 8″.

There are to be no doors in Parlor.

Door-Furniture: — Basement doors to have two strap hinges and iron latch; outside-door to have bolt. Hatchway-door to have handle and hook, of iron.

All doors, except Kitchen and Servant's-room, to be hung with two 4″ x 4″ Berlin bronze butts; those to be 4″ x 4″ japanned iron.

All doors, except closets, to have mortise locks and latches; closets to have mortise latches.

All to have composition knobs.

Inside Finish: — All inside finish, except Kitchen, Servant's-room, Pantry, chimney-closet, and clothes-closets, to be ⅞″ thick, with reeded face, beaded corners, and flush corner-blocks, 5″ wide. The rest to be plain; finish in closets, 4″ wide.

Base: — Base in first story to be 9″ wide with moulded top; in second story to be 8″ wide with bevelled edge.

Stairs: — Basement to have two plank carriages, with 1¼″ treads, no risers. Rear stairs, to second floor, to have two carriages with 1¼″ treads, ⅞″ risers.

Front stairs to be of red-oak, three carriages 1¼″ treads ⅞″ risers, moulded nosings, turned balusters, square newel, provided for newel-light; all as shown by details.

Wainscot the Kitchen and Bath-room, up four feet from floor, with 3″ bevelled pine sheathing; to have base 5″ wide, and moulded cap.

Closets to have two rows of japanned-iron hooks set 9″ apart in each row and alternating, and secured to strips 1″ x 3″; upper strips 5′ 6″ from floor; lower, 4′ 6″ from floor.

Each closet to have shelf ⅞″ x 16″ set 18″ from ceiling.

Pantry and China-Closet to have table shelf 1¼″ x 18″ with two dwarf drawers, 4″ deep, under each, and cupboards under these.

Pantry to have place for flour-barrel, with hinged lid in shelf. Each to have four shelves above, without doors, set 12″ apart.

Sink to be of clear, soft pine, 5″ deep, 18″ x 30″, with joints white-leaded, and to have drainer at each end; have one door underneath.

Bath-Room to be finished in first-quality clear white-pine for hard oil-finish.

Water-Closet: — Fit water-closet with double lids, both hinged, and whole put together with screws for readily taking apart.

Bowl: — Provide door under bowl.

Stripping: — Lay strips when necessary to attach water-pipes.

Veranda: — Veranda floor to be 1¼″ stuff, 4″ wide, 1″ pitch. Ceiling of same ⅞″ x 3″ beaded pine, with moulding in angles.

Tin: — Line gutters with IX roofing tin, 14″ wide. Line valleys with IX roofing tin, 14″ wide.

Conductors to be 4″ tin where shown on plans, connected at grade with drain-pipe, and properly attached one inch from walls.

Flash all necessary outside wood-work, such as behind all sawed panels, tops of belts, etc.

Hot-Air Pipes to be of heavy charcoal iron with soldered joints, attached with band-iron straps, in places shown on plans, and of their respective sizes.

Registers: — Furnish and fit all warm-air registers where shown, to be 10″ x 12″ provided with valves, and japanned faces.

Drains: — Excavate and refill all trenches necessary to lay all drains and water-supply.

Drains to be of first quality hydraulic-cement pipe of sizes and in places shown on plans, provided with all necessary traps, etc.

Main drain to have trap with hand-hole with 4″ vent-pipe to grade. Drains must have Y-branches, and be laid 2″ below cellar bottom.

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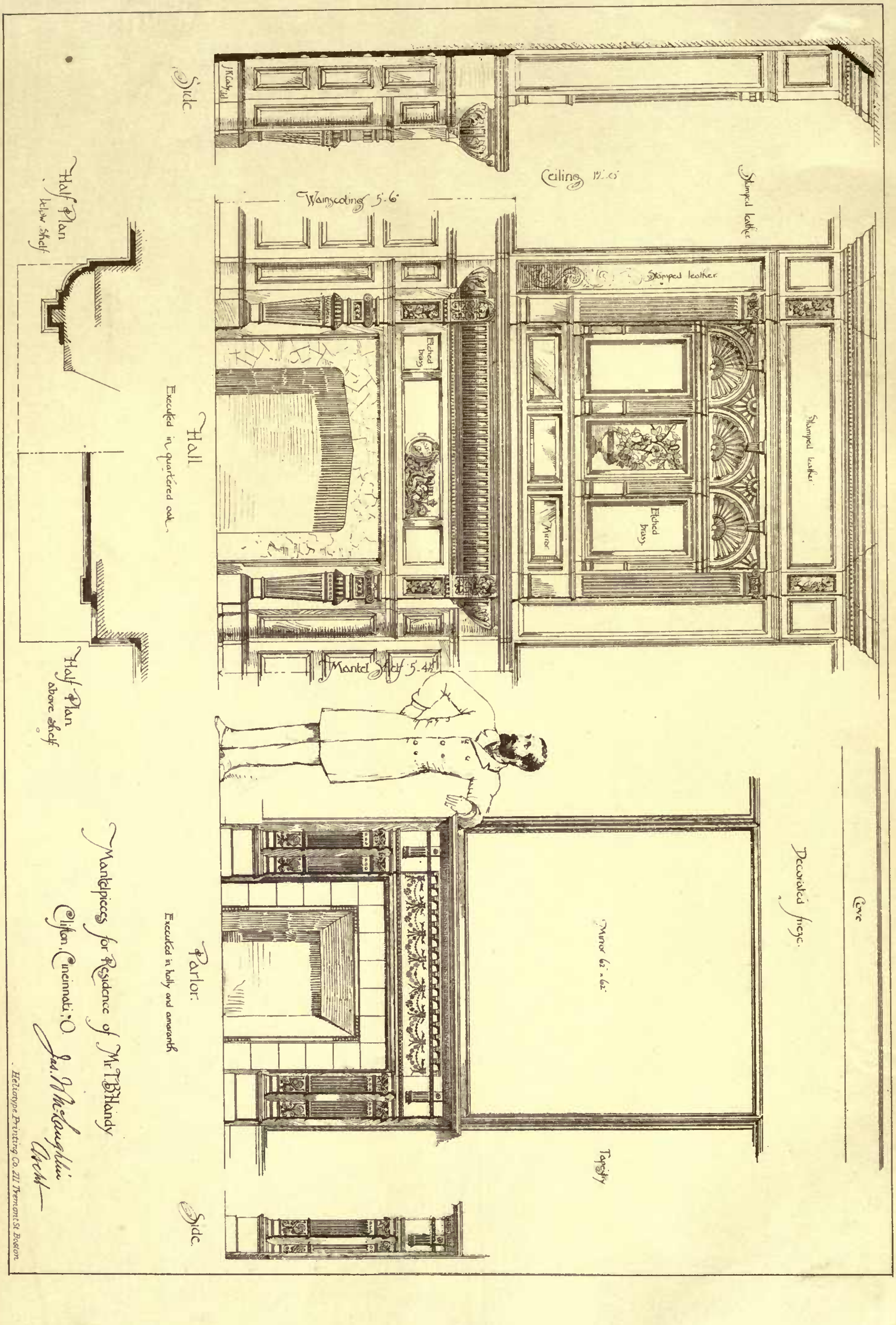

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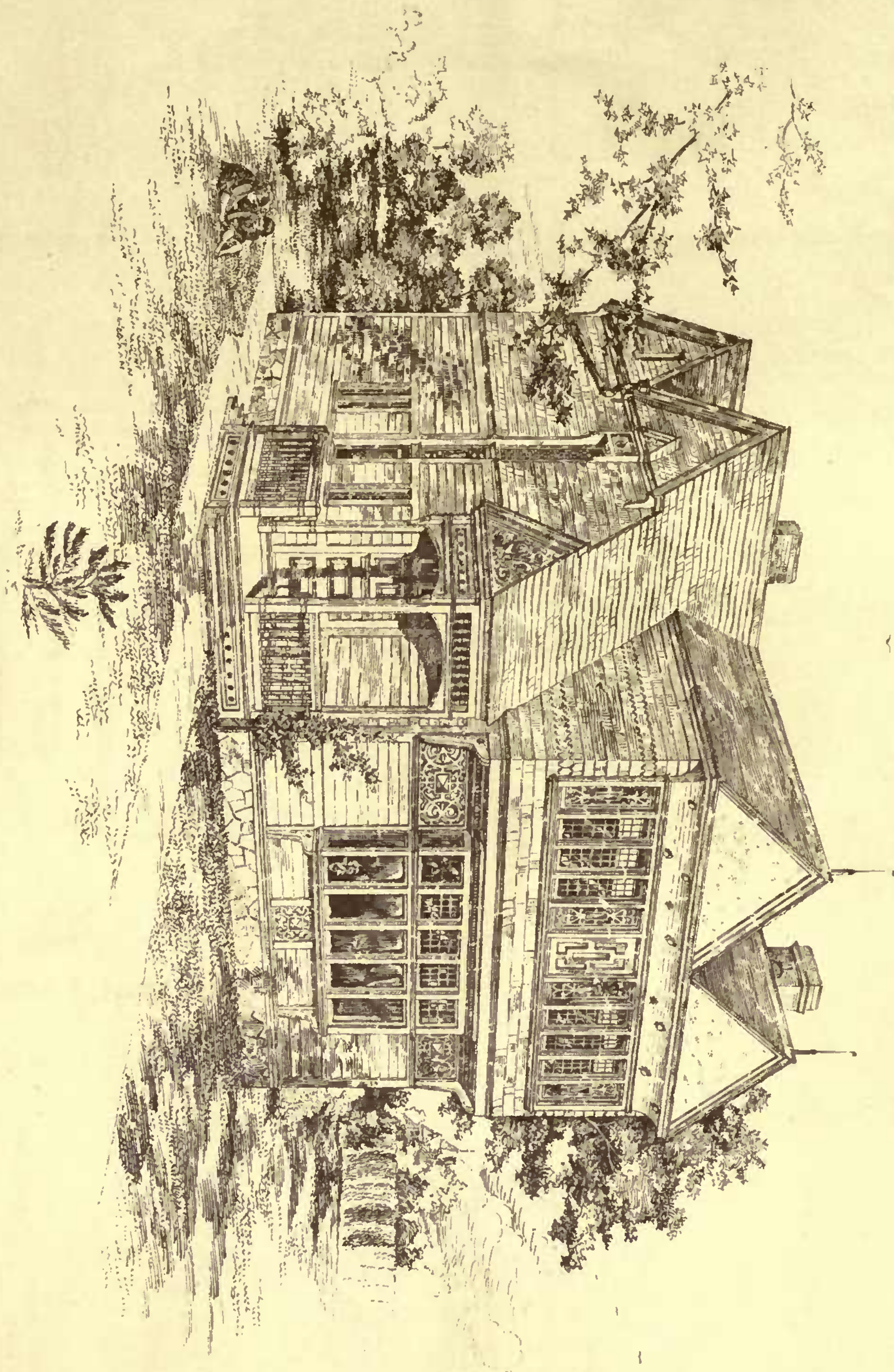

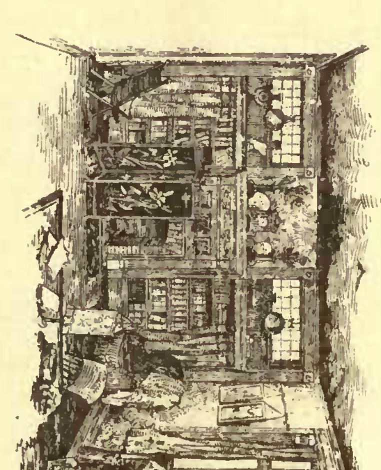

American Architect Competition
Design for a $3,000 House

Heliotype Printing Co. 211 Tremont St. Boston

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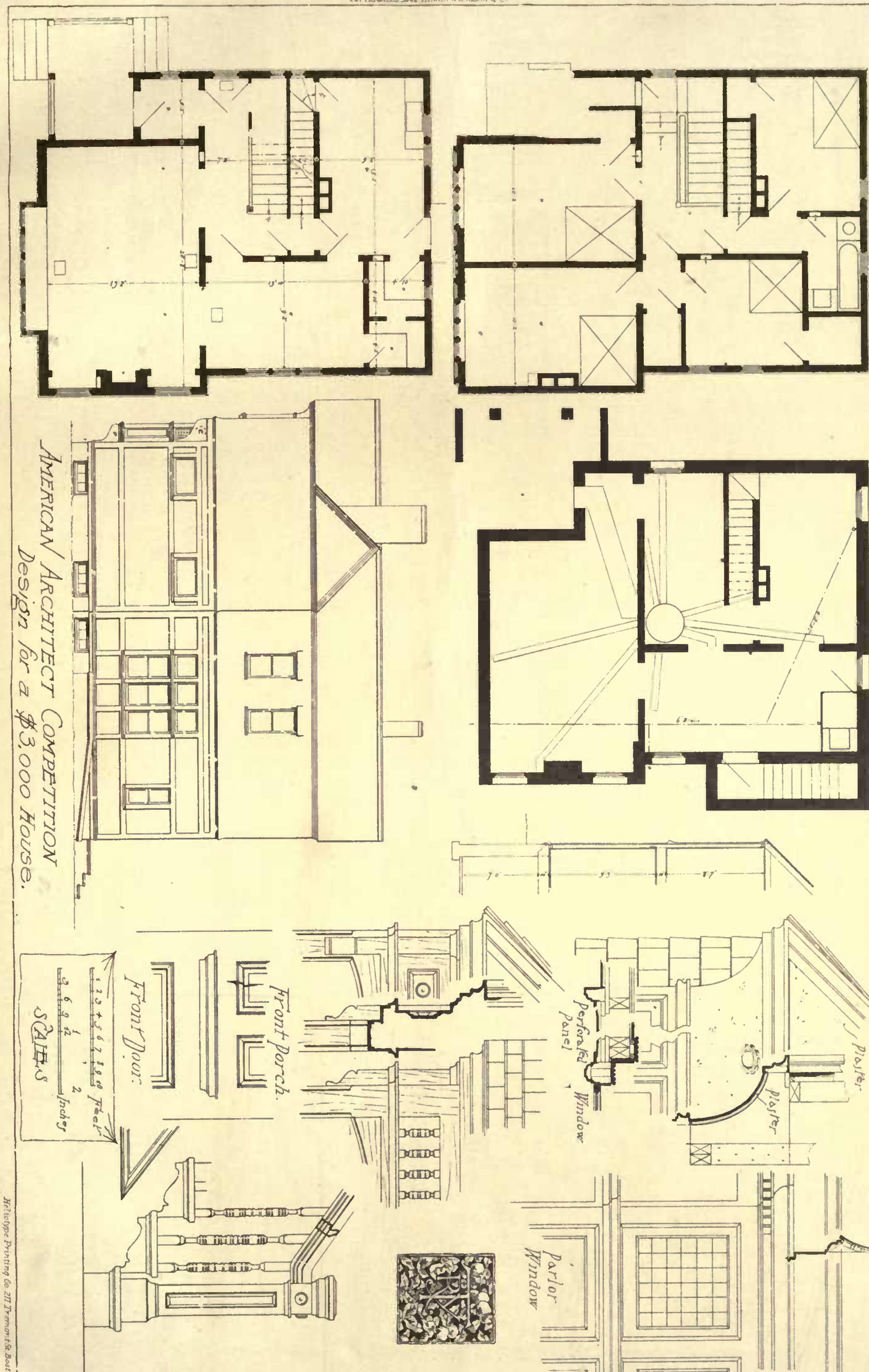

Heliotype Printing Co. 211 Tremont St. Boston.

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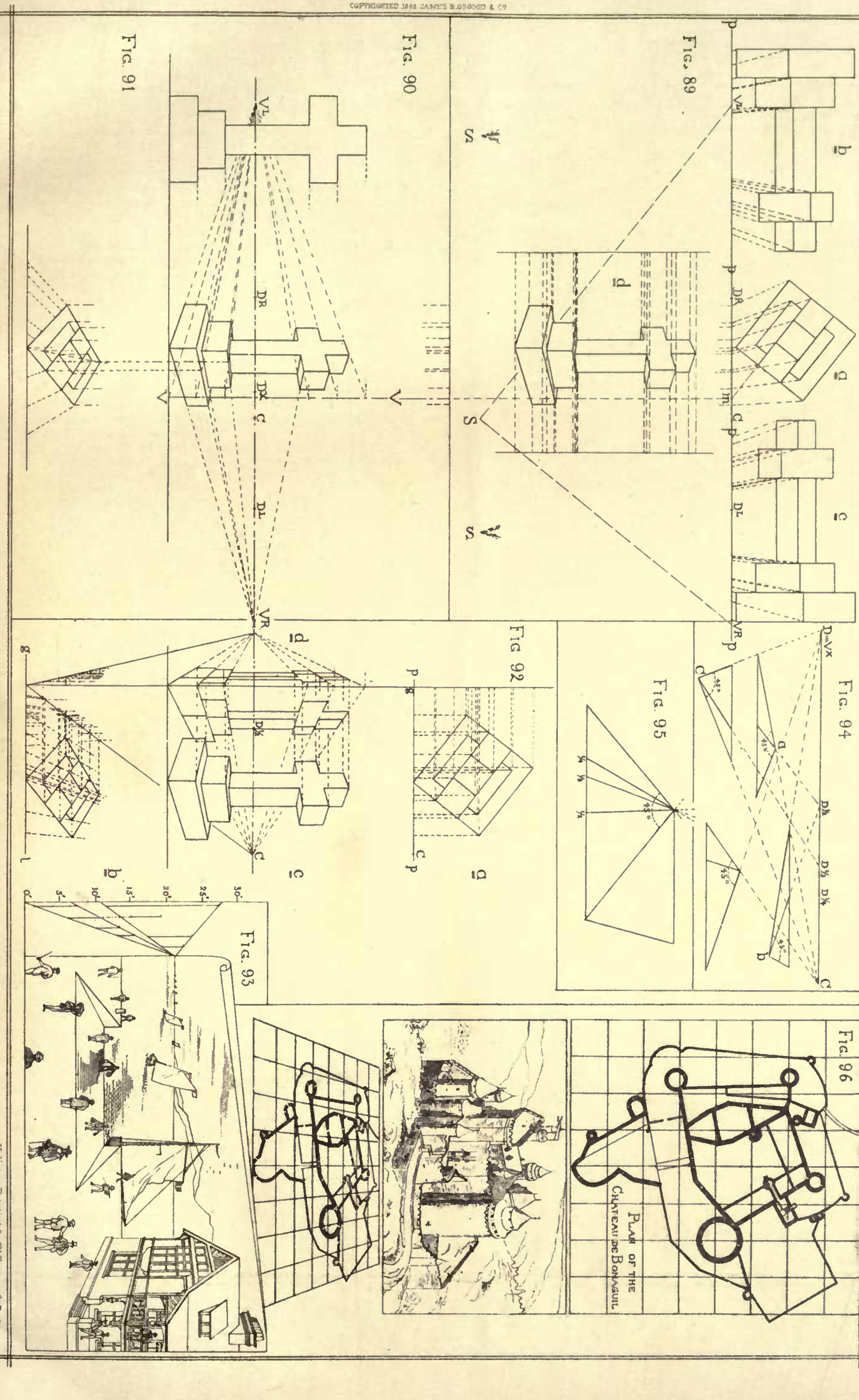


PLATE XX. VARIOUS METHODS.

Heliotype Printing Co. 211 Tremont St. Boston.

Pipes:—All lead, supply and waste pipes secured to ⅞″ boards, and no pipes to run on outside walls, and all must be laid so as to clear themselves when shut off.

Front of building is 30′ from street. Supply-pipe is ⅝″, the hot-water pipe is ⅝″, and hot and cold are to run both to Kitchen-sink and Bath-room.

Soil-Pipe to be 4″ cast-iron, and to extend one foot out of roof; to have lead joints, and be attached with proper hooks and hangers.

Boiler: — Set 30-gallon galvanized-iron boiler on cast standard, and connect with range and pipes.

Provide ⅜″ sediment-cock and pipe, and connect with nearest waste-trap. To have ⅝″ stop-cock on supply.

Water-Closet to have 4″ 6-lb. sheet-lead traps; supply-pipe to have stop-off cocks to control same.

Bath-room to have a Cooper, Jones & Cadbury valve pan-closet.

Basement to have plain hopper-closet.

Tub: — Bath-tub to be 6′ long, of 10-oz. planished copper.

Bowl: — Basin to be 12″ bowl, marble slab with sunk scotia, and 10″ high; ½″ plated bibbs, rubber plug, chain and all complete; back Bower's traps to bowl and tub.

Tub to have combination-cock with rubber tube and plated shower.

Provide shut-off cock, box and rod at Kitchen-sink.

Bath-room fixtures to be nickel-plated. Kitchen fixtures brass.

Gas: — Pipe house for gas to each room where shown on plans by * to be not less than ⅜″ for any fixture-connections.

All pipes must be graded so that any water can be drawn out at some convenient point near meter.

All joints to be made in red-lead.

Painting: —Clean off and smoothly sand-paper all wood-work before applying any paint. Shellac all knots and putty all nail-holes before beginning.

Outside: —Shingles of roof to be painted two coats of Indian red and linseed oil.

The shingles of the second story to be painted three coats, the color to be an olive, made with yellow ochre, Prussian blue, black and a bit of red. The siding of the first story to be same, several shades deeper. The olive to be well on the ochre side of the color. Belts of first story to be Indian red with a little black mixed. The sawed panels to be nearly a pure ochre, perhaps a trifle darker and warmer. These outside colors to have no white lead.

Interior: —All interior wood-work to be three coats of parti-color, to match papers if desired, except Bath-room and front stairs, which are to have Wheeler's filling, properly applied, and then two coats of hard oil-finish, rubbed down with pumice and oil to a dead and even surface. Wood-work in basement to have one coat.

Glazing: —All sashes to be set with double-thick American glass, that in front rooms to be selected with most care. Transom-lights in Parlor window to be quarry-glazed in tinted cathedral glass of 3-inch squares.

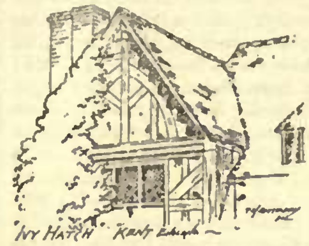
All to be properly bedded, tacked, puttied and left clean and whole on completion of building.

ESTIMATES OF QUANTITIES AND PRICES RULING IN MILWAUKEE, WIS.

[In the following estimates, the carpenter-work, mason-work, painting and glazing were figured by a responsible contractor who is just finishing a residence from "*Try*'s" drawings. The other items are figured by responsible firms here, and names of all can be given if desired.]

MASON.	
Excavating	$42.00
12½ cords stone, laid	187.50
5 M. brick, laid	60.00
2 chimneys, at $1 per foot	75.00
3 M. brick laid cellar floor	30.00
660 yards plaster	132.00
Plaster in cove and gables	15.00
6 stone sills	3.00
Total	$544.50
CARPENTER.	
7,000 feet lumber in place	175.00
8,500 feet matched fencing in place (25 % allowed)	210.00
1,200 feet siding, in place (25% allowed)	36.00
750 feet A select, 1¼″, in place (25 % allowed)	58.00
2,500 feet mouldings, outside, in place. (This includes furring out shingles at bottom second story)	41.50
Finish of gables	25.00
100 feet ridges, in place	10.00
15,000 shingles, in place	75.00
Gravel roof on deck	20.00
500 lbs. paper	25.00
600 lbs. nails in all	24.00
Back steps	8.00
Sawed panels, in place	25.00
Front porch, complete	50.00
Basement.	
Hatchway complete (stairs and covers)	15.00
6 basement windows, in place, complete	18.00
Cellar stairs	15.00
Basement W. C.	10.00
Cold-Air Box	10.00
5 doors, plank frames; batten door complete in place	25.00
First Floor.	
150 feet base-board in place	15.00
Parlor window complete in place	60.00
2 small windows in Parlor in place	$10.00
11 other windows, finish and all, in place	100.00
10 doors, casings and hardware, 1⅜″, in place	90.00
1 front door, 1¾″, in place	15.00
Bath and Kitchen wainscot up 4 feet in place	25.00
Kitchen sink	10.00
Cutting for plumber	6.00
Pantry and China-closet complete	35.00
Front stairs, of oak, in place	80.00
Closet under, with hooks and shelf	5.00
Back stairs up	25.00
Second Story.	
Windows in front chambers in place, without panels	60.00
5 other windows complete	40.00
215 feet baseboard	17.20
Bath-room finish beside wainscot	15.00
13 doors up-stairs, 1⅜″	104.00
Floors all in matched fencing.[?]	
Bell from front door to kitchen	10.00
Total	$1,587.70
PLUMBING.	
6-foot 10-oz. planished copper tub	14.00
Pan closet	10.00
12-inch bowl, slabs and cocks	15.00
30-gallon galvanized-iron boiler	15.00
Trimmings to sink	4.00
30 feet 4 inches soil-pipe	10.00
200 feet ⅝-inch pipe	40.00
Cock over boiler	2.00
Bath-cock	5.00
Shut-off cock, rod and box	1.50
Curb stop and box	3.00
Water permit	4.00
Waste-pipe, lead	10.00
Fastenings and stays	3.00
Hopper-closet, trap and all	10.00
4-inch lead trap	3.00
60 feet 6-inch drain, 40c., laid	24.00
Trap	$2.00
Sewer permit	3.00
14 feet 4-inch drain, 30c., laid	4.20
Labor	30.00
2 Y's and 4 elbows	4.00
Total $216.70	
60 feet conductors	6.00
50 feet gutter	10.00
Flashing, etc.	40.00
195 feet gas-pipe in place	20.00
Total $76.00	
120 feet furnace-pipe, single	30.00
8 registers, 10 x 14	$12.40
8 feet smoke-pipe	3.00
Furnace	125.00
12 elbows	3.00
Total $173.40	
Glazing	40.00
Painting	205.00
Total $245.00	
Architect's commission at 5%	150.00
Total	$2,993.30

HORTICULTURAL BUILDINGS.[1]

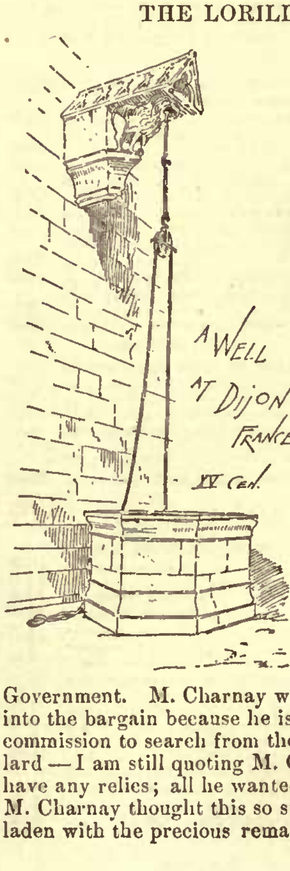


MR. F. A. FAWKES, F. R. Hort. S., read a paper lately on this subject before the Architectural Association, illustrated by numerous diagrams and sections, drawn to large scale, and executed with great clearness and firmness of outline. He said he proposed to deal with his subject in regard to questions of construction, leaving those of architectural design and structural detail to the architect, and all methods of planting to the gardener. Horticultural buildings might be divided into two classes: growing-houses — to which he should principally confine attention — and showing-houses. The former class might again be subdivided into three sections: the first, those in which plants were grown in pots or stages, or at a certain distance from the glass; this section comprising simple greenhouses, plant-houses, houses for bringing on bedding stuff, some descriptions of orchard-houses and plant-stoves, without bottom heat. The second section included houses in which foliage was trained along the roof, such as early and late vineries, muscat, peach, and other orchard-houses. The third and last section comprehended houses in which root-action was stimulated, such as cucumber and melon houses, fruit succession and fruiting-houses, pits with forcing or propagating beds, and plant-stoves containing heated beds. In the second-class, or show-houses, conservatories were the principal buildings. The peculiarly trying conditions under which horticultural buildings existed — viz., the varied temperature outside and within; the moisture-laden air of the interior; the exposed character of the structures; the necessity for durability, solidity, and yet the minimum obstruction to light — warranted every precaution being taken that the materials used should be thoroughly sound; that the construction allowed of no crevices for retention of moisture or the harboring of insects; and that the buildings, by subsequent periodical painting and repair, were kept in good preservation. The first main point in connection with a growing-house was to determine the pitches of roof most advantageous for various purposes. The more nearly sunlight struck the glass roof at right angles, or within 30° of a right angle, the less obstruction to the rays of light did the glass offer. The next point was how to obtain the maximum impingement of the sun's rays at, or as near as possible to, a right angle, for the position of the sun relatively to the earth was always varying. In most cases, for plant and flower-growing purposes, especially when pot-plants required to be near the glass, a low pitch economized space and artificial heat, and was better than a high pitch. He recommended, therefore, a pitch of from 26° to 30°; but if it was lower than 26°, rain would drift in under the laps. For fruit-growing along the rafters, when the ripening process required the maximum sun influence, from 36° to 44° pitch was desirable; and for wall fruit, where the glass required to be as near the wall as possible, and a specially narrow form of house was adopted, 60° to 70° of pitch might be allowed. For many varieties of growing, a lean-to was the most suitable form of house, and it also utilized a wall or building already in existence. The best possible effect for such a house was to face the south, but even then some portion of the sunlight was lost. In consequence of the brick protection to the north, and the glass-work fronting south, a lean-to was easier to heat than a house in which the glass was exposed in every direction. When no high wall existed or was required, or for building a right angle to lean-tos facing south, or when a minimum height or equable heating of all parts was required, span roofs were the most suitable. In such a house the ridge should run north and south, and thus the contents of the house would obtain as perfect a distribution of the sun's rays as possible. Those two forms of roof, the lean-to and the span, were the most simple forms employed; but there was a third, which was a compromise between the two, the three-quarter span. This was employed when the back wall of a lean-to had to be kept as low as possible, or when it was necessary to let light in at the back. When a number of houses were required they should be planned so that the group should be as compact as possible, and the buildings for consecutive operations should be as far as could be arranged in consecutive order. The boilers should be fixed in the most convenient position for their work, and no separate building should be allowed to suffer unnecessarily from the combination with others. Important points in the planning of these buildings were site and levels. Where the site could be made a matter of choice, care should be

[1] From the *Building News.*

taken to ensure a place where trees or other objects were not likely to obstruct the sunlight, and thus ascertain the site which presented the greatest relative advantages with regard to aspect, drainage, stoke-hole, furnace, chimney, potting, and fuel-sheds, and retaining a particular view from other buildings. If the ground were not level, the exact nature of the irregularity should be ascertained; if fully level in the direction of the length of buildings, well and good; if otherwise, means must be taken to correct the variations. In any case of irregularity the boiler should be placed at the lowest end. Even supposing the ground to be perfectly horizontal, the question of floor-levels would have to be considered. As a general rule, the levels of the floor should correspond with those of the ground; but if there were a difficulty of drainage, or the boiler could not be made as low as was necessary, it was advisable to raise the floor-level. It might, to reduce obstruction to a minimum, be necessary to sink the floor-line in some cases below the ground; but in that case, great care should be exercised as to the drainage, or the house might be perpetually flooded. Formerly it was more common to sink the houses in order to retain heat; but with modern facilities for heating, such a course was unnecessary. Houses in combination, forming one range, should, if possible, have their floors on the same level. Stages from one house to an adjoining one should be avoided; but if necessary, parallel, disconnected lines of house might occupy different levels without inconvenience. In all cases, easy intercommunication for a wheel-barrow should be provided between houses. In constructing a glass house, several points should be remembered, especially in regard to the roof. Obstruction to the sun's rays should be minimized; yet the structure should be durable and substantial, and lateral thrust should be avoided. The rafters should be sufficiently deep for the purpose, yet not so deep that the oblique solar rays would be materially arrested. For growing-houses, a roof well tied with light iron rods would enable rafters to be much shallower than would otherwise be possible. His experience showed that a sash-bar roof, with T-iron purlins between the rafters, was lighter, had less material in it, was not so liable to rot, and, in fact, answered every practical purpose better than the heavier and more substantial sash-roof. The advantages of the sash over the sash-bar combination were that the roof could be practically stripped if more air were required within, and the building could be removed without the necessity for taking out the glass. Passing on to consider the questions of glass and glazing, the lecturer stated that for clear glazing 21-oz. English sheet was generally used. Thinner qualities were not so advisable, and Belgian glass was not so desirable as English. Wavy or speckled glass was apt to scorch plants. For a semi-obscure glass, Hartley's rolled plate was generally used. He had come to the conclusion that for use in purely growing horticultural houses, no system hitherto invented was more advantageous than putty-glazing. Putty-glazing was so inconvenient to renew, and so apt to crack and peel off, that horticultural builders would welcome any method which promised to be more advantageous, but the requirements had not at present been met. In all the mechanical methods of glazing, the glass came into contact with either a metallic or an elastic substance. In the former case there must be a sufficient amount of "play," or the glass would certainly break; in the latter case the elastic substance was found in practice, chiefly in consequence of internal moisture, excessive variations of temperature, and atmospheric influences, to give far more trouble to gardeners than putty properly made and applied. If any "play" was given to the glass, hot-air escaped, and such houses could not be thoroughly fumigated, while the glass was broken by the freezing of water collected in the crevices, which also harbored insects. The most usual form of ventilator was a framed light, hinged at the top and open from the bottom outwards. Sliding sashes for roof ventilation had almost gone out of fashion, except for single frames, low pits, and houses in which the roof had at times to be practically stripped. For other purposes sliding roofs were cumbrous and unmechanical. Both top and bottom ventilators should extend along the whole length of a house, except in the case of top ventilators of a span or three-quarter span, which might be arranged alternately on either side of the ridge. Continuous ventilators then being necessary, consecutive lights might be made to open simultaneously, or each could be arranged to open separately. Unless the lights were very numerous, the latter plan was generally the best, and the ordinary notched "set-opens" could be used for lower lights, and a quadrant actuated by a cord and a counterbalance-weight for upper and top lights. When, however, to save time, or from inaccessibility, there was not convenient means of opening, the best gear was a pair of double-jointed arms attached to each light and keyed to a bar held in blocks fixed to the mullions. The partial rotation of the bar and opening of the lights might be effected by a handle keyed on to the bar at any part, pinned to a quadrant, or the motion could be conveyed by a connecting-rod to some distance. Similar apparatus could be used to actuate top-lights. Double-jointed arms were the best form, as they offered no obstruction to pots, plants or foliage. Roofs had occasionally to be wired to support foliage trained under them. A good plan for wiring, say a lean-to, was to take two flat bars, turned edgewise, and suspend them at back and front by holdfasts, bolted at back through the wall, and at front into the mullions. Then at the necessary intervals wires should be stretched across by means of raidisseurs to the two bars. Intermediate parallel bars, dependent upon the length of rafter, would serve to support these wires, which could thus be arranged at any distance apart, and could be altered as was found necessary. They were thus more convenient for painting, and to the gardener's needs, than permanently-fixed wires. The lecturer mentioned that he usually employed No. 12 B. W. G. wire, spaced ten inches apart and ten inches from the glass. In planning the staging in a house the points to observe were facility of drainage from pots, economy of space, accessibility, and proper distance from glass, each depending on the height of plants to be grown. The usual lattice-wood stage, composed of three-inch by one-inch laths with three-quarter-inch spaces between them, was very suitable; but where the plants required to be set into damp moss, sand, or shingle, carefully drained concrete, zinc or slate lined, and wooden stages were necessary. In a nursery the chief requirements were training-wires along the roof, a prepared border about three feet deep, and provision for thoroughly draining the border, and for preventing, by means of a concrete bed, or otherwise, the roots of vines from penetrating the subsoil. The front wall should be built on arches to allow of the soil border running outside, as well as within the house. The chief feature of a forcing-pit was an arrangement of hot-water pipes for heating the soil of which the bed was composed, supplementary to, and independent of, the pipes for atmospheric heat. A better plan than carrying these pipes through the bed itself was to take them through an air-chamber under the bed; in this position the vapor-troughs were more accessible and the whole arrangement was better. It was best to keep those three classes of houses for plants, grapes, and cucumbers separate, for, if combined, a high degree of cultivating efficiency had to be sacrificed. He must first allude to show-houses or conservatories, as to which several points should be kept in view. The conservatory must be treated as one of the reception-rooms of the dwelling, and without departing from its strictly horticultural character, an endeavor should be made to approximate it architecturally, both inside and without, to the other portion of the house. Having designed with a view to this, the remaining points to be carried out could be summed up thus: Give as much light as possible; ornament the construction, and never construct the ornament. Interest and pleasure should be excited by the broad lines of a conservatory rather than by meretricious and fussy detail. As to the interior, throw away stages, hide the pots, and give natural beds and banks of foliage and flower, massed with artistic irregularity. Let there be an ample paved space — not a mere path — between these, so that a chair and table can be placed in the conservatory, and treat it as a lounge rather than a mere place to be walked round in single file. If size permit, then rockwork, or fountain, or sculpture may find a place in it. Baskets of hanging foliage have a good appearance; bare walls can be hidden by creepers; and an awkward space in the brickwork may sometimes be turned into an aviary. In fact, while not sacrificing the strictly horticultural *raison d'être* of the structure, a judicious combination of art with nature may intensify the enjoyment derived from a conservatory, and the beauties of plants and flowers may be absolutely enhanced by the introduction of such artistic accessories as have been mentioned.

THE LORILLARD EXPEDITION.



M. CHARNAY has come back to Paris from that Mexican journey which he was enabled to make through the liberality of Mr. Pierre Lorillard. The circumstances are well known. M. Charnay had already explored Mexico for remains of ancient American civilization, but he wished to return, only his government either could not or would not find the money. In such matters governments are all alike. So Mr. Pierre Lorillard put his hand in his pocket; and M. Charnay has now done Yucatan thoroughly at his expense and has brought home a superb collection of the remains of Toltec civilization. That is the result for Europe, and for America, it seems to be that there is now a heap of ruins in Yucatan called Lorillard City. Of all these archæological treasures, America and Mr. Lorillard are to have nothing, although they were collected with the aid of Mr. Lorillard's money. When the matter was first talked of — so M. Charnay says — the explorer proposed that Mr. Lorillard should share half-and-half with the French Government. M. Charnay was obliged to introduce his government into the bargain because he is a French professor and received his commission to search from the Ministry of the Interior. Mr. Lorillard — I am still quoting M. Charnay — said that he did not care to have any relics; all he wanted was to promote the search for them. M. Charnay thought this so strange that when his bark came home laden with the precious remains of early American civilization, he

thought it his duty to make a second offer to Mr. Lorillard, this time not of originals, but of casts from the collection. He did this with the direct assent of the French Government, and he was authorized, moreover, to sound Mr. Lorillard as to his willingness to accept the Legion of Honor. The offer of the decoration was also made to Mr. Thorndike Rice, who has warmly interested himself in the whole undertaking. The casts, M. Charnay suggested, might be sent to the Museum in Central Park, a much more accessible place for them than the Smithsonian Institution. He accordingly wrote to Mr. Lorillard and to Mr. Thorndike Rice, but he has never had a word from either in reply. He cannot understand this, he says, and he is much embarrassed, both on his own account and on account of his government. The French Government cannot offer the Legion of Honor without having a previous certainty that it will be accepted, nor can they go to the expense of sending the casts without knowing that Mr. Lorillard would care to have them. According to M. Charnay, the statues and inscriptions brought over are invaluable, especially from his point of view, as they establish his contention in regard to the Toltec origin of early American civilization, and the comparative modernness of the Toltec work. He has found nothing over seven centuries old, and he thinks that the fact of his having found anything at all is conclusive on the question of age. Most of the ruins are in excellent preservation, and if they were much earlier in origin this would certainly not be the case. The climate and the soil and the manner of building are not calculated to preserve them. The ruins in Greece, where everything is favorable for preservation, are at present in a worse condition than those of Yucatan, for which a far higher antiquity is claimed. All this will only increase our regret that Mr. Lorillard should not have secured a fair share of these treasures for his own country. One is quite at a loss to understand his indifference on this point. It seems that when the first offer was made — of half a share of the originals — he not only declined, but on M. Charnay's representation that people would think it strange, he telegraphed back, "I don't care." Now he does not even give himself so much trouble as that in rejecting the second offer of casts and public honors — he does not answer at all. M. Charnay says he is lost in conjectures as to the cause of a silence which he considers wanting in respect to his government, not to speak of himself. He wonders whether Mr. Lorillard and Mr. Rice may have taken offense at his not having called upon them on his way back with the treasures. At that time, it appears, he was suffering from a painful and disfiguring tumor in the face, due to the bite of an insect, which made it impossible for him to show himself in society before he had seen his doctor. I give you his version of the matter just as I had it from his own lips. No doubt it will admit of a reply.— *Richard Whiting in the New York World.*

A SEWAGE FARM IN THE LEA VALLEY.

SCULPTURED PANEL : FOUNTAIN AT PÉROUSE. ITALY.

THE following are some particulars of the sewerage works which have recently been carried out in the special drainage district of Much Hadham and Hadham Cross, a town situated on the river Ash, a tributary of the Lea. Previously to the execution of the works, the place was in the usual unsatisfactory condition which obtains where cesspools form the only means of disposing of the sewage. A number of the wells were found upon analysis to be contaminated. The district is of a somewhat rural character, and it was considered one where the surface-water generally was sufficiently pure to flow at once into the natural water-courses. The separate system of sewerage was then determined upon. The nature of the place made it somewhat difficult to gravitate the sewage onto land sufficiently raised above the level of flood-waters, and so avoid the error, only too prevalent in the Lea Valley, of discharging sewage onto land too low to be effectively underdrained; but it was found after careful investigation that a suitable site could be acquired some miles down the line of the Ash. The sewage is taken to this land by a 12-inch outfall-sewer, having a gradient of 1 in 660, which contours the side-long ground to the west of the valley for the purpose of obtaining convenient depths. The man-holes on the outfall-sewer are furnished with sluices, so that the flow can be headed-up and a velocity obtained in excess of that due to the gradient. The tributary sewers are 9 inches in diameter, with the exception of a short length having a rapid fall, which is 6 inches. The gradients are so arranged as to give the greater falls where they are most required, at the upper ends, and average about 1 in 100, except in the case of the principal town sewer, where there is a considerable flow of sewage, which has a gradient of 1 in 300. These sewers also are provided with sluices in the man-holes to aid the flushing arrangements. The total length of the sewers is about two miles and a half, and they are constructed throughout of stoneware pipes, jointed with yarn and Portland cement. Particular care was exercised to secure water-tight sewers, and an idea may be gained of the success of these efforts when it is known that, although at the completion of the works not a drop of water got into them (notwithstanding the fact that a considerable section was laid below the level of the subsoil waters), yet before a dozen house-connections had been made a stream of sewage passed down the whole length of the outfall-main onto the land. Ample ventilation is afforded by man-holes and lamp-holes at frequent intervals, which are carried up to the surface and covered with strong Iron gratings. These covers are well finished off, having four rings of granite pitching bedded round them, falling slightly away from the centre, so that the danger which so often exists to horses and carriage-springs is entirely obviated. The flushing arrangements are very complete for a district without a water-supply. One of the flushing-tanks (the largest) is placed at the extreme head of the system, and its contents can be suddenly discharged through a 9-inch outlet pipe. Water is collected chiefly from land-drains and the road surfaces, but the large tank already referred to is supplemented with an Abyssinian well and pump, so that even in the dryest seasons water can be obtained at the point where it is most needed; and as the net-work of sewers is arranged so that nearly the whole can be flushed, if necessary, from this one tank, the system is practically independent of the storage of rainfall for flushing purposes. It has been found by experiments that even without the use of the sluices in the man-holes one discharge produces a flow of considerable velocity through the entire length, which is maintained to the extreme point of outfall. No settling-tanks are provided to retain the sewage until putrefaction sets in— a frequent cause of nuisance— but a small straining-tank in duplicate receives the flow and intercepts rags, corks, etc. It is needless to say that under the above conditions the sewage reaches the outfall in a fresh state, and becomes assimilated by the soil and vegetation long before decomposition takes place. The sewage-farm recently purchased by the Sanitary Authority consists of some four acres of land on the west bank of the Ash. The soil is a light gravel lying above the chalk. Water-tight pipe conduits are constructed along and across the farm, and are furnished with an efficient system of sluice-chambers to enable the sewage to be directed to any required spot. Part of the area has been trenched two feet deep, and the remainder was deeply cross-ploughed. The whole of the sewage is passed over the surface and through the soil. The works have only been completed some six months, and the farm is already in full work. A good roadway has been made along the line of the upper boundary, affording ample facilities for cartage, etc. The system of sewerage is found to work well, and it is to be hoped that as much care has been taken in carrying out the connections. The total cost of the structural works was under £2,500. Messrs. Smith & Austin were the engineers who designed and carried out the works, and Mr. Barnard Lailey performed the somewhat onerous duties of resident engineer. We hear that at Wormley also, lower down the valley of the Lea, land has been acquired, and that works of sewerage are about to be carried out by the same engineers.— *The Builder.*

A QUESTION OF PAYMENTS.

FORT WAYNE, IND.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — Perhaps it would be right and proper to bring to your notice, and for the benefit of the profession, a case in our courts here, where one Trennam, an architect, is the plaintiff, and one O'Conner is the defendant. The testimony shows that O'Conner employed the architect to make him sketches for a house to cost four thousand dollars, but such a house as was wanted would cost eight or ten thousand, and he was so informed by the architect. The owner is nearly blind, and wanted the architect to make him a rough pencil-sketch that he might take it home to show to his family, instructing the architect how he would like the rooms located, and what size. The sketch was made, also pencil-drawings worked out for all plans and elevations, and said O'Conner and family had asked and requested that such-and-such things might be made so-and-so to suit their ideas of a house.

The scale-drawings and tracings were made and colored, but as the testimony shows, the owner had ordered the architect to stop; that it was too late in the fall to build, and he was going South. Nothing more was done for some months. The owner not visiting the office of the architect, the architect called at the home of the owner and asked for fifty dollars, and stating that the drawings were nearly ready for figuring, except details and specifications. The owner asked who ordered him to finish the drawings, and further stated that he would not pay him his bill. Several weeks after the owner was to start South he called on the architect and paid him twenty-five dollars, as he supposed, in full, and took a receipt. In his absence his wife and daughter called on the architect and had some alterations made and some sketches, and on his return he employed other architects.

Architect Trennam met O'Conner on the street and asked him to settle his account, $80. O'Conner said he would not pay a cent. He was sued in Justice Court and judgment given the plaintiff, $58; in the higher court judgment given the plaintiff, $35. The plaintiff's charges were one per cent on $8,000 and one-half per cent on $8,000 for ruined sketches.

I. X. L.

THE ORIGINAL PORTRAITS OF WASHINGTON.

To the Editors of the American Architect: —

Dear Sirs, — Referring to Mr. Charles Henry Hart's review of her work "Original Portraits of Washington, including Statues, Monuments and Medals," in No. 337 of the *American Architect,* June 10, 1883, Miss Johnston notes with pleasure that Mr. Hart places at her disposal *all his data* relative to Washington portraits. Miss Johnston is now preparing a second edition of this work, and she desires to avail herself of this offer, and will be obliged if Mr. Hart will forward to the editor of the *American Architect,* for her use, the data referred to. The author cheerfully corrects, in this new edition, inaccuracies that have been pointed out by reviewers, or discovered by herself, having an earnest desire to free the work from error and establish the history of Washington portraiture.

THE ARCHITECTURAL ASSOCIATION OF MINNESOTA.

St. Paul, Minn., January 15, 1883.

To the Editors of the American Architect: —

Dear Sirs, — The Architectural Association of Minnesota held its annual and regular meeting at Minneapolis, on the 2d inst. The roll of officers elected for the current year is as follows: E. B. Bassford, of St. Paul, President; Isaac Hodgson, of Minneapolis, Vice-President; D. W. Millard, of St. Paul, Secretary; Fred. G. Corser, of Minneapolis, Recording Secretary; J. Walter Stevens, of St. Paul, Treasurer.

The work of the past year has been chiefly that of organization. A closer acquaintance has been promoted among the architects, and it is probable that other and practical benefits will follow the promised endeavors of active members in the near future.

Respectfully yours, D. W. Millard, *Secretary.*

NOTES AND CLIPPINGS.

The new Façade of Florence Cathedral. — The portion of the façade which is now completed, and which can be seen as yet only by penetrating beneath the matting which entirely conceals all the scaffoldings, represents financially about half or two-thirds of the computed cost of the whole façade, and it is truly marvellous to think that such an enormous surface can have been covered with such admirable marble tarsia and carved work for so small a sum as 500,000 francs—about £20,000. Such a result is possible only, thanks to the greatest ingenuity and economy of the superintendents and to the exceptional resources, physical and mental, of Tuscany. The material is altogether Tuscan, the white marble having been brought from Serravezza, the red (like a fine *rosso antico*) from the neighborhood of Siena, the green from Prato, and a rich red breccia from the Garfagnana. The work is also entirely Tuscan. The models of the statues have been supplied at cost price. The highest day's wages of any of the workmen is from three to six francs. Six francs a day are the wages of the head stone-mason, who with his son has modelled and chiselled all the finest arabesques and foliations of the portals, some of which are extremely bold and at the same time delicate in effect. The workmen, whose number has just been reduced from seventy to sixty, are almost entirely from the districts of Fiesole and Settignano, which gave Florence some of her greatest Renaissance sculptors in Mino, Benedetto da Majano and Benedetto da Rovezzano. To these men, who are none of them able to draw, who have learnt all that they know from study of the older portions of the cathedral and from patient practice, are given only the general measurements and the roughest outline in charcoal on the wall by the architects, and they furnish a much better idea of the men who worked at Pisa, at Siena, or at Chartres than could any highly taught and highly æstheticised modern architect. Still while admiring the beautiful work of these masons (which contrasts painfully with the feeble inspirations of the modern sculptors who have tried to adapt to Gothic purposes the remnants of the insipid Bartolini style of fifty years ago), we must not forget how much in really striking and beautiful effect of the façade is due to the architects, obliged to study, often to guess, under the matting of the scaffoldings, the exact proportions and reliefs of all the various portions of an enormous mass of marble incrustations which will be seen at such different heights and distances. — *The Athenæum.*

Discovery of a Mausoleum on the Island of Rhodes. — The Austrian archæological authorities have had the luck to find at Gulbaktche, opposite the island of Rhodes, a mausoleum of great importance, and to recover almost the entire sculptural decorations, consisting of reliefs of subjects from the "Odyssey," combats of the usual character of the best time of Greek art, — Greeks with Amazons, with Asiatics, etc.— the whole of which, though cut in a sandstone not calculated to resist weather as the limestones do, are in an excellent condition. The Turkish Government, on learning the importance of the find, telegraphed to their official in charge that he was not to permit the series of reliefs to be separated. The Government firmans always claim the half of the sculpture found in the excavations on the Crown lands, but the Austrian Superintendent, interpreting this in the sense that they were all to go together, claimed the whole by virtue of this order, and had them shipped before the mistake, if it was one, could be corrected. Doubtless the Stamboul authorities meant quite otherwise, but it is open to debate whether, if the Turkish Government was responsible for a decision which virtually annulled the rule of division of the *trouvaille* the Austrians had not the right to avail themselves of the modification to their own advantage. The Porte had certainly no right to claim the Austrian half of the proceeds of the joint enterprise, and if the series must be kept entire the only practicable solution was that which the Austrian Superintendent of Works arrived at. The monument will be set up at Vienna. — *Pall Mall Gazette.*

Earthquakes and Pagodas.— A notable instance of the Japanese understanding of the conditions under which they exist occurs in the manner of giving security to pagodas. Pagodas are often of great height, yet many have existed for seven hundred years, and have withstood successfully the many vibrations of the ground, which must have inevitably achieved their overthrow had they been erections of stone or brick. When I first ascended a pagoda I was struck with the amount of timber employed in its construction; and I could not help feeling that the material here wasted was even absurdly excessive. But what offended my feelings most was the presence of an enormous log of wood in the centre of the structure which ascended from its base to its apex. At the top, this mass of timber was nearly two feet in diameter, and lower down a log equally large was bolted to each of the four sides of this central mass. I was so surprised with this waste of timber that I called the attention of my good friend Sakata to the matter, and especially denounced the use of the centre block. To my astonishment he told me that the structure must be strong to support this vast central mass. In my ignorance I replied that the centre part was not supported by the sides, but upon reaching the top I found this monstrous central mass suspended like the clapper of a bell; and when I had descended I could, by lying on the ground, see that there was an inch of space intervening between it and the earth which formed the floor of the pagoda. The pagoda is to a Buddhist temple what a spire is to a Christian church, and by its clever construction it is enabled to retain its vertical position even during the continuance of earthquake shocks, for by the swinging of this vast pendulum the centre of gravity is kept within the base. I now understand the reason for that lavish use of timber which I had so rashly pronounced to be useless, and I see that there is a method in Japanese construction which is worthy of high appreciation. In the absence of any other instance, the employment of this scientific method of keeping the pagoda upright shows how carefully the Japanese have thought out the requirements to be met.— *Dresser's "Japan."*

Proposed Ship Railway in Canada.— Our readers will remember that a commission with the late Hon. John Young as chairman, reported in 1875 adversely to the long projected Baie Verte Canal, across the Isthmus of Chignecto, which separates the Bay of Fundy from Baie Verte, in the Gulf of St. Lawrence, or rather in Northumberland Strait, opposite Prince Edward Island. The estimated cost was $8,000,000, and the time proposed for construction eight years. The annual charge would have been at least $500,000, and on this account chiefly the scheme was finally interred without serious protest from the Maritime Provinces, where influential local jealousy of it, as calculated to divert traffic from existing routes, was known to exist. Last year Mr. H. C. G. Ketchum, a New Brunswick civil engineer, came before the Dominion Parliament with a proposal to substitute a ship railway over the same route, in place of the defunct canal scheme. He obtained a charter for the Chignecto Ship Railway and a subsidy of $150,000 per annum for twenty-five years, when and so long as the railway should be in successful operation. Mr. Ketchum carried the scheme to London, where, after some delay arising out of the effect of the Egyptian question on the financial market, he has succeeded in getting it taken up by an eminent contractor, subject to the favorable report of his own engineer, who is now engaged with Mr. Ketchum in examining the site, ascertaining cost of construction, nature and extent of traffic, etc. If the scheme is carried out, the Dominion will be the first country in the world to possess a ship railway, and probably there is no other country which possesses a site more favorable in its engineering aspects for a perfect railway — that is a ship railway — without curves or grades.— *The Iron Age.*

Improved Papier-Mache Process. — A durable and inexpensive method of employing papier-maché as a substitute for mattings, carpets, oil-cloths and other floor coverings, has been introduced, the simplicity of the process being also an additional advantage in its favor. After the floor has been thoroughly cleaned, the holes and cracks are then filled with paper putty, made by soaking newspaper in a paste made of wheat flour, water and ground alum, that is, to one pound of such flour are added three quarts of water and a tablespoonful of ground alum, these being thoroughly mixed. With this paste the floor is uniformly coated, and upon this a thickness of manilla or hardware-paper is placed, or if two layers are desired, a second covering of paste is spread on the first layer of manilla paper, and then the second thickness of paper is put on, and the whole allowed to become perfectly dry; on this being accomplished another surface of paste is added, succeeded by a layer of wall-paper of any style or pattern desired. On the work becoming entirely dry it is covered with two or more coats of sizing, made by dissolving one-half pound of white glue in two quarts of hot water, and when this has dried, a coat of "hard oil finish varnish," nothing more being required after the latter has had time to become thoroughly dry in every part. — *Providence Journal.*

Reopening a Roman Basilica. — Yesterday being the festival of Pope St. Damasus, solemn high mass was celebrated in the interesting old Church of Sts. Laurence and Damasus — which was rebuilt by Bramante, in connection with the Palace of the Cancelleria, on the site of the primitive Basilica of the sixth century — for the first time since it was closed for restoration in 1868. The celebrant was Cardinal Bilio, and the ceremony was performed with all possible pomp; but the attention of the crowd present was naturally divided between the service, the splendor of the decorations, the new frescoes, by Grandi and Fontana, of the martyrdoms of Pope St. Sixtus II. and of St. Laurence, and the monument to another and a later martyr, Pellegrino Rossi, Pius IX's Minister who was assassinated in November, 1848, on the staircase just opposite the door of the Basilica. There were few, if any, who, on leaving, did not go to look at the spot where he fell. The ceremonies connected with the reopening of the Basilica began on Saturday with the recognition of the relics, which were carried processionally to the high altar and deposited in the place prepared for them; and on Sunday the ceremony of consecrating the altar was performed, Cardinal Bilio also officiating on both these occasions. — *London Times.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

270,580. IMITATION OF METAL CASTINGS OR CARVINGS. — George B. Dexter, Boston, Mass.
270,602. GAS-TRAP FOR SINKS, URINALS, ETC. — William Moran, Williamsburgh, N. Y.
270,607. SASH-FASTENER. — John O. Reily, Warren Tavern, Pa.
270,608. MANUFACTURE OF CEMENT. — Ludwig Roth, Wetzlar, Prussia, Germany.
270,613. ROCK-DRILL. — Chas. W. Stickney, Washington, D. C.
270,623. FIRE-PROOF CEILING. — Charles J. Bandam, New York, N. Y.
270,635. DOOR. — William S. Castor, Marston, Ill.
270,648. LOCK FOR ELEVATOR-GATES. — John W. Ellwanger and William Eddington, St. Louis, Mo.
270,675. APPARATUS FOR HOISTING AND LAYING STONE. — Griffith Hunter, Chicago, Ill.
270,677. FIRE-PROOF CEILING. — Ernest V. Johnson, Chicago, Ill.
270,698. HEATING-FURNACE. — Jeremiah J. Richardson, Brooklyn, N. Y.
270,704. MOULD FOR MAKING CEMENT-PIPE. — Nathan W. Stowell, Los Angeles, Cal.
270,706. SCHOOL-HOUSE HEATER. — Jacob Voegtle, Indianapolis, Ind.
270,731. AUTOMATIC FIRE-EXTINGUISHER. — Chas. E. Brennan, Charlottesville, Va.
270,741. PIPE-WRENCH. — Friederich Cajar, New York, N. Y.
270,754. WATER-CLOSET BOWL. — John Cropper, New York, N. Y.
270,761. CONSTRUCTION AND VENTILATION OF SANITARY DEVICES, ETC. — Matthew F. Deegan, Chicago, Ill.
270,769. CAVITY-PLANE. — James England, New York, N. Y.
270,801. AUTOMATIC FIRE-EXTINGUISHER. — Chas. L. Horack, Brooklyn, N. Y.
270,819. FAUCET. — Herman H. Liemke, St. Louis, Mo.
270,822. HAND-SAW. — George G. McChesney, Middletown, N. Y.
270,828. DOOR-KNOB. — Gustave Newberg, Chicago, Ill.
270,832. HOT-AIR REGISTER. — Patrick W. Nolan, New York, N. Y.
270,833. STAINING COMPOUND FOR WOOD. — Anthony W. O'Blenus, New York, N. Y.
270,839. DEVICE FOR LATHING. — Stuart Perry, Newport, N. Y.
270,840. SPIKE. — William H. Perry, Sharon, Pa.
270,847. GLASS-CUTTING FRAME. — William R. Rodman, New Burnside, Ill.
270,851. CORNICE. — Samuel R. Scottron, Brooklyn, N. Y.
270,856. HOLLOW AUGER. — William L. Stoddard, Elvaston, Ill.
270,859. ROOF. — Christian Svendsen, Clinton, Io.
270,876. SEWER OR STENCH TRAP. — Lee D. Craig, San Francisco, Cal.
270,880. HINGE. — Samuel D. Halley, St. Louis, Mo.

SUMMARY OF THE WEEK.

Baltimore.

DWELLING. — Messrs. J. A. & W. T. Wilson, architects, are preparing drawings for B. F. Newcomer, Esq., for a residence on the e s of St. Paul St., between Biddle and John Sts. It is to be of brick and stone, 30' x 88', and will cost about $40,000; Mr. John Marshall will be the builder.

BUILDING PERMITS. — Since our last report one permit has been granted, which is as follows: —

J. T. Carter, three-st'y brick building, with two-st'y brick back building, e s Central Ave., between Hoffman and Oliver Sts.

Brooklyn.

BUILDING PERMITS. — *Sumpter St.*, No. 205, n s, 125' w Saratoga Ave., two-st'y frame dwell., tin roof; cost, $2,300; owner, Anton Merz, 21 Hall St.; builder, J. Pirring.

Herkimer St., Nos. 578 and 582, s s, 265' and 315' w Schenectady Ave., 2 two-and-a-half-st'y frame dwells., gravel roofs; cost, about $2,300 each; owner, John McKesson, 91 Fulton St., New York; architect and builder, W. J. Wilson.

Seventeenth St., s s, 120' e Fifth Ave., 5 two-st'y frame tenements, tin roofs; cost, total, $12,000; owner, Chas. Long, 383 Eleventh St.; builder, J. F. Wood.

Washington Ave., e s, 107' 7" s Butler St., three-st'y frame tenement, tin roof; cost, $2,850; owner, Wm. Dale; architects and builders, M. Freeman's Sons.

Magnolia St., s s, 250' e Irving Ave., three-st'y frame store and tenement, tin roof; cost, $4,000; owner, Anton Vogt, 430 Humboldt St.; builder, J. Dahler.

Myrtle Ave., n s, 63' w Cedar St., three-st'y frame store and tenement, tin roof; cost, $3,000; owner and builder, H. C. Bauer, 721 Bushwick Ave.

Vernon Ave., n s, 30' w Tompkins Ave., 4 three-st'y frame dwells., tin roofs; cost, each, $3,500; owner, Anna A. Fardon, 119 Carlton Ave.; architect and builder, A. A. Fardon.

Bedford Ave., n w cor. Park Ave., 6 three-st'y frame dwells., gravel roofs; cost, each, $7,500; owner and architect, J. G. Glover, 21 Montague St.

Chauncey St., Nos. 140 and 142, s s, 200' e Reid Ave., 3 two-st'y frame dwells., tin roofs; cost, each, $2,500; owners and builders, Adams & Donaldson, 85 Macon St. and 2214 Fulton St.; architect, T. Donaldson.

Willoughby Ave., n w cor. Sanford St., three-st'y brick mill, gravel roof; cost, $12,000; owners, White, Potter & Paige M'f'g. Co., 415 Willoughby Ave.; architect, M. J. Morrill.

Boston.

HOUSE. — A dwelling, near the corner of Fairfield St. and Commonwealth Ave., is now in progress. It is of brick and stone, five-st'y, 21' x 82'; Mr. George Wheatland is the owner; Vinal & Dodge and Laming & Drisco, the contractors; and Mr. O. F. Smith, of Boston, the architect.

BUILDING PERMITS. — *Brick.* — No permits have been issued for brick buildings since the last report.

Wood. — *Harvard St.*, near Wales St., Ward 24, for Samuel B. Faulkner, two-st'y pitch dwell., 20' and 21' 6" x 30'; Samuel B. Faulkner, builder.

Unnamed St., from Tremont Court, Ward 24, for Byron A. Atkinson, 2 one-st'y and mansard dwells., 19' 6" x 28'; and 3 one-st'y and mansard dwells., 20' 2" x 28'; Freman Hopkins, builder.

Centre St., near Dorchester Ave., Ward 24, for Ira A. Medbury, two-st'y pitch dwell., 32' x 44'; Ira A. Medbury, builder.

East Fourth St., near I St., Ward 14, for James E. Rowe, 2 one-st'y mansard dwells., 20' x 33'; Henry Keyes, builder.

Harvard St., s s, Ward 24, for Cheever Newhall, 2 two-st'y and pitch dwells., 29' and 21' 6" x 30'; Chas. E. Currier, builder.

Walnut Ave., near Dale St., Ward 21, for Wm. Donaldson, 2 two-st'y pitch dwells., 20' x 30'; ell, 15' x 15'; Wm. Donaldson, builder.

Ray St., near Hulburt St., Ward 21, for John B. Mulvey, 2 three-st'y flat dwells., 15' and 20' x 41'; John B. Mulvey, builder.

Sheridan Ave., near Chestnut Ave., Ward 23, for Mrs. Victoria Sammet, two-st'y pitch dwell., 26' and 30' x 48'; James Simpson, builder.

Medford St., Nos. 507 and 509, Ward 4, for Page & Littlefield, one-st'y flat storage, 20' and 35' x 64'.

Chelsea St., Nos. 315-321, Ward 1, for Andrew B. Porter, three-st'y pitch currying-shop, 50' x 75'.

Halleck St., near Prentiss St., Ward 22, for Geo. F. Burkhardt, one-st'y flat wagon-house, 37' x 58'.

Commercial St., near Shamrock St., Ward 24, for McNeil Bros., two-st'y flat storage of lumber, 23' x 43' x 62' 6"; McNeil Bros., builders.

Chicago.

BUILDING PERMITS. — P. J. Ryan, two-st'y and basement brick dwell., 21' x 38', 153 South Sangamon St.; cost, $5,500.

Frank Nowak, two-st'y and basement brick flats, 21' x 44', 118 Farquar St., cost, $3,000.

M. McCarthy, two-st'y brick flats, 22' x 54', 3801 Butterfield St.; cost, $2,200.

J. J. Powers, one-st'y basement, 21' x 45', 3218 Butterfield St.; cost, $1,000.

Wm. Mara, three-st'y brick flats, 50' x 55', Winchester Ave. and Van Buren St.; cost, $10,000.

T. C. Goudie, two-st'y brick flats, 21' x 42', Superior St., near Rockwell St.; cost, $2,500.

Wm. Reisner, one-st'y brick store, 20' x 50', 486 Lincoln St.; cost, $1,500.

F. Hemberg, one-st'y brick store, 20' x 50', 28 Rees St.; cost, $1,000.

Albert Crane, one-st'y brick cottage, 20' x 32', Emerald Ave., near Thirty-first St.; cost, $1,000.

Cincinnati.

STORE. — Mr. David Sinton is to build a new store on Fourth St., between Vine and Race Sts. The lot is 47' on Fourth St., and 100' deep. The building will be five-st'y, and will be used for stores and offices; Mr. Jas. W. McLaughlin, architect.

BUILDING PERMITS. — The following building permits have been issued since our last report: —

Mrs. E. N. Rule, three-st'y brick, corner of Fifth St. and Broadway; cost, $5,000.

B. N. Gerleman, three st'y brick dwell., Elizabeth St., near John St.; cost, $4,500.

Frank Werner, three-st'y brick dwell., Harrison Pike; cost, $4,000.

Thos. Emery's Sons, eight-st'y stone-front building for banking and office purposes, Fourth St., near Walnut St.; cost not stated, but supposed $100,000; Samuel Hannaford, architect.

S. L. Wilder, four-st'y brick store, Sixth St., near Elm St.; cost, $4,000.

Benj. Kuhlman, three-st'y brick dwell., Ohio Ave.; cost, $8,000.

Four permits for repairs; cost, $2,000.

Louisville, Ky.

BUILDING PERMITS. — Very few building permits have been issued since last report. Those of $2,000 and over are as follows: —

J. H. Post, brick dwell.; cost, $2,000.

Mrs. M. A. Matlack, frame dwell.; cost, $2,200.

R. Burke, brick dwell.; cost, $2,500.

M. A. Irving, brick dwell.; cost, $4,500; M. I. Wilson, architect.

Mrs. Mary Pulliam, brick dwell.; cost, $5,700.

Chestnut St. Baptist Church, brick church; cost, $60,000; H. Wolters, architect.

Jno. G. Barrett, brick store; cost, $18,000; C. A. Curtin, architect.

Minneapolis, Minn.

HOTEL. — The contracts were let on Wednesday last for the stone-work in the West hotel, and for much other work.

TENEMENT-HOUSES. — Orff Bros. are preparing the plans for a three-st'y brick and stone tenement, to contain four houses, which C. B. Moses will build on the corner of Hawthorne Ave. and Fifteenth St.

HOUSES. — H. G. Sidle and family have vacated their Hennepin Ave. residence to make way for Mr. Sidle's new block.

Mr. J. W. Erwin, of Richfield, is to build a $7,000 house after plans by Kees & Fisk.

The house in process of erection for Gen. Rosser is to be duplicated in Atlanta, Ga., and the plans are being traced by Kees & Fisk.

New York.

CATHEDRAL. — It is stated that the great Roman Catholic Cathedral (St. Patrick's) in Fifth Ave. is to be completed speedily, and that some arrangement to that end has been made, whether through a subscription or by money advanced for the purpose, is not related.

HOSPITAL. — The Italian Benevolent Society has decided to erect a hospital, not a monument, to the honor of Garibaldi.

OFFICE-BUILDING. — For the Commercial Union Assurance Co., of London, a first-class six-st'y office-building of irregular dimensions, averaging about 20' x 78'; is to be built on the n e cor. of Pine and Williams Sts., from designs of Mr. Geo. E. Harney. The front will be of stone in the basement and first-st'y, and above will be brick with stone finish, and probably a light introduction of terra-cotta will be used. The building will contain all the modern improvements, and will cost at least $80,000.

BANK. — For the Mount Morris Bank, a building is to be erected on the n w cor. of Fourth Ave. and One Hundred and Twenty-fifth St., from designs of Messrs Lamb & Rich. The front is to be of brick and red stone. The cellar is to be used for vaults; the basement by a Safe Deposit Co.; the first floor for bank purposes, and the upper stories for apartments.

STABLE. — A stable 70' x 100' is to be erected on the north side of Seventy-fifth St., 80' w of Lexington Ave., for Mr. Thomas Patten from designs of Mr. George Martin Huss. It is to be four stories, of brick with terra cotta finish. The basement will be utilized for a riding ring; the first floor will contain offices, a ladies' reception-room, and storage for carriages; the second floor will accommodate seventy-seven horses.

CLUB-HOUSE. — The "Progress" Club is to have a picturesque club-house, in the Moorish style of architecture, erected on Fifty-ninth St., bet. Fourth and Lexington Aves. It is to be 50' x 100', three stories high and fire-proof throughout. The front will be brick and terra-cotta, with colonnettes and spandrels of bronze. The ball-room is to be decorated in the Moorish style. The cost will be about $80,000.

BUILDING PERMITS. — *Ave. A*, Nos. 169 and 171, 2 five-st'y brick tenements and stores, tin roofs, cost, each, $14,000; owner, Louis P. Kollwagen, 49 Seventieth St.; architect, Wm. Jose.

Eighty-eighth St., n s, 235' 6" e Fourth Ave., 2 five-st'y brick tenements, tin roofs; cost, each, $15,000; owner, Honora Byrne, 128 East Ninetieth St.; architect, John McIntyre; builder, —— Byrne.

One Hundred and Eighth St., n s, 150' w Second Ave., 12 four-st'y brownstone front tenements, tin roofs; owner, Jacob L. Marschke, 192 Division St.; architect, John C. Burne; builder, not selected.

Franklin St., Nos. 9 and 11, six-st'y brick store, tin roof; cost, $45,000; owner, Morris S. Herrmann, One Hundred and Fifteenth St., near Fifth Ave.; architect, Geo. W. Da Cunha.

Marion Ave., w s, 500' n Kingsbridge Road, 2 two-st'y frame dwells., tin roofs; cost, each, $2,000; owner, Annie Arctander, Willis Ave., near One Hundred and Forty-sixth St.; architect, Arthur Arctander.

Eighth Ave., s e cor. One Hundred and Forty-third St., 3 four-st'y brick tenements and stores, tin roofs, cost, two, each, $10,000, one $8,000; owner and builder, Patrick Whelan, One Hundred and Thirty-eighth St., near Southern Boulevard; architect, Geo. S. Ferris.

West Fortieth St., No. 237, five-st'y brick tenement and store, tin roof; cost, $16,000; owners, L. & K. Ungrich, 160 West Thirty-third St.; architect, M. L. Ungrich.

One Hundred and Forty-third St., n s, 425' e Willis Ave., 8 two-st'y and basement frame dwells., tin roofs; cost, each, $2,200; owner, Chas. Van Riper, 683 East One Hundred and Forty-third St.; architect, H. S. Baker.

One Hundred and Forty-fourth St., n s, 38' 6" e College Ave., 2 two-st'y frame dwells., gravel roofs; cost, each, $2,000; owner, Anna La Cost, One Hundred and Forty-fourth St., cor. College Ave.; architect, H. S. Baker; mason, C. S. La Cost.

One Hundred and Forty-third St., s s, 175' w Eighth Ave., two-st'y frame dwell., tin roof; cost, $3,000; owner, Wm. Naegele, 2392 Fourth Ave.

One Hundred and Forty-fourth St., s s, 130' e Third Ave., four-st'y frame tenement, tin roof; cost, $6,000; owner, Mrs. Caroline Tegimeyer, One Hundred and Forty-sixth St., between Willis and Brooks Aves.; builders, John C. Stichler and John Freese.

Forty-eighth St., n s, 100' w Tenth Ave., 14 five-st'y brownstone front tenements, tin roofs; cost, each, $20,000; owner, Chas. Riley, 1435 Lexington Ave.; architect, John C. Burne; builder, not selected.

Forty-ninth St., n s, 100' w Tenth Ave., 10 five-st'y brownstone front tenements; tin roofs; owner, Wm. Rankin, 306 West Forty-seventh St.; architect, C. F. Ridder, Jr.; builder, not selected.

West Fifty-first St., No. 554, five-st'y brick tenement, tin roof; cost, $10,000; owner, Katharina Dettling, 555 West Fifty-first St.; architect, C. F. Ridder, Jr.; builder, not selected.

Brook Ave., n e cor. One Hundred and Forty-fourth St., three-st'y frame tenement, tin roof; cost, $5,000; owner, John O'Harran, One Hundred and Forty-fourth St., e of Brook Ave.; architect, J. H. Burrows.

First Ave., No. 436, three-st'y brick factory, gravel roof; cost, $5,800; owner, Carl H. Schultz, One Hundred and Fortieth St., w of Boulevard; architect, Ed. E. Raht; masons, R. L. Darragh & Co.; carpenter, not selected.

ALTERATIONS. — *Broadway*, No. 53, raise one-st'y and internal alterations; cost, $30,000; owners, R. & O. Goelet; architect, Jos. M. Dunn. To be done by day's work.

Grand St., Nos. 85 and 87, five-st'y brick and iron extension, tin roof; cost, $30,000; owner, Joseph

Fisher; architect, Wm. H. Hume, s w cor. Fifth Ave. and Fourteenth St.; builder, not selected.

Tenth Ave., No. 723, internal alteration and new store front; cost, $2,500; owner, D. Knickmann, 318 West Fifty-eighth St.; architects, A. Pfund & Son.

First Ave., No. 434, new walls; cost, $2,500; owner, Carl H. Schultz, One Hundred and Fortieth St., near Boulevard; architect, Ed. E. Raht; masons, Robert L. Darragh & Co.

Madison Ave., No. 341, raise one-st'y and additional support in first-st'y front; cost, $5,000; owner, Charles A. Dards, on premises; architect, J. E. Terhune.

Philadelphia.

BUILDING PERMITS. — The past week has been almost void as to the issuing of permits, consisting of a few alterations and additions, with the following buildings: —

Ward St., No. 1326, 3 two-st'y dwells., 16' x 30'; Daniel Carlin, contractor.

Oxford St., n e cor. Mervin St., one-st'y building, 12' x 57'; Chas. Wolter, owner.

Portland, Oregon.

Plans are now being prepared for a number of large business blocks which will be commenced in a few months' time.

It is expected more buildings will be put up this year than during any past year.

STORES. — H. H. Northrup has just started to build a two-st'y brick building for business purposes, 50' front, by 80' deep; Scharno & Davidson, contractors; J. Krumbein, architect; cost, $10,000.

TENEMENT-HOUSES. — Henry Fleckenstein, Esq., is having plans prepared for four two-st'y tenements, 100' frontage; cost, total, about $14,000; J. Krumbein, architect.

HOUSE. — Mr. Gundolph has had plans drawn for a two-st'y residence; cost, $18,000.

STORES AND THEATRE. — W. H. Williams, architect, is preparing plans for a three-st'y brick building, 100' x 100'; the lower part will be fitted up for stores, and the upper part for a variety theatre; cost, $5?,000; its construction will be commenced March 1st.

HOUSE. — Mr. Williams has also prepared plans for a residence and stable for R. Knapp, Esq.; cost of residence, $40,000; stable, $10,000.

Following is a list of architects doing business in Portland: W. A. Williams, Charles Talbot, Joseph Sherwin, W. Stokes, Burton & McCaw, Justus Krumbein and Neer & La Romer.

The indications at present are that an unusual amount of building will be done throughout Oregon the present year.

St. Louis.

BUILDING PERMITS. — Sixteen permits have been issued since our last report, of which eight are for unimportant frame houses. Of the rest those worth $2,500 are as follows: —

Jas. A. Quirk, 2 two-st'y brick dwells.; cost, $8,500; Thos. Gugerty, contractor.

Jas. A. Quirk, two-st'y brick dwell.; cost, $6,500; Thos. Gugerty, contractor.

P. H. Tobin, two-st'y brick dwell.; cost, $6,000; G. E. Miller, contractor.

Bids and Contracts.

ALBANY, N. Y. — The following is a synopsis of bids received at this office under advertisement dated December 14, 1882, for glass for the custom-house, etc., at Albany, N. Y.: De Pauw's American Plate Glass Works, $2,975; Edward A. Boyd & Sons, $3,006; William Glenny & Co., $3,260; London & Manchester Plate Glass Company, $3,281.50; Heroy & Marrenner, $3,342; D. H. Fonda & Co., $3,437; Semon, Bache & Co., $3,593.50; Halbrook Brothers, $3,688.95; William Dey, Ermond & Co., $3,713.73. The bid of De Pauw's American Plate Glass Works has been accepted.

PHILADELPHIA, PA. — The following is a synopsis of bids received for iron stairways for the post-office and court-house at Philadelphia, Pa.; C. Hitzeroth, $2,525; Bartlett, Hayward & Co., $4,350; Snead & Co., $4,473; R. Tippetts & Sons, $4,900; Phœnix Iron Company, $5,197; Haugh, Ketcham & Co., $5,904.94; W. Bugbee Smith, $6,250; S. J. Creswell, $7,200; Cheney & Hewlett, $8,169. The bid of C. Hitzeroth, the lowest, has been accepted.

General Notes.

BRATTLEBORO, VT. — The committee on competitive designs for the proposed new school-house have selected that of George A. Hines, architect, of Brattleboro. The building is to be of brick, two-st'y, with mansard roof; to accommodate six hundred scholars, and to cost not more than $40,000.

BROOKLINE, MASS. — The Brookline alms-house which is now under contract, will be a frame building measuring 31' x 72', with wing, 20' x 22'; there will be a basement and two finished stories, with an unfinished attic in the pitch roof; Mr. O. F. Smith, of Boston, is the architect.

BUFFALO, N. Y. — The following list of buildings have either been lately completed or are in process of construction: —

Four-st'y brick block with sandstone trimmings, stores and flats, cor. of Niagara and Pennsylvania Sts.; owner, F. W. Ames; cost, $30,000.

Brick malt-house on Morgan St.; owner, Moffat & Co.; cost, $18,000.

Roundhouse for Lackawanna R. R., at East Buffalo; cost, $24,000.

Car-shops for Lackawanna R. R., at East Buffalo; cost, $25,000.

Brick warehouse for W. H. Glenny & Co., Pearl St.; cost, $15,000.

Additions to car-shops, N. Y. C. R. R.; cost, $5,000.

Iron-works, Perry St.; owner, W. H. Harris; cost, $20,000.

CHATTANOOGA, TENN. — Three-st'y brick building, 25' x 113', for Temple & Shipp; cost, $7,000; I. E. Burdick, architect.

Three-st'y brick building, 28' x 200', for Dietzen Bros.; cost, $10,000; I. E. Burdick, architect.

Brick dwell. for I. L. Crandall; cost, $4,500; I. E. Burdick, architect.

Brick dwell. for Dr. Baxter; cost, $5,000; I. E. Burdick, architect.

Frame dwell. for W. W. Yonge; cost, $3,000; I. E. Burdick, architect.

DUBUQUE, IO. — W. H. Peabody, Esq., is preparing to build a block of three residences, each two-st'y and basement, brick, 32' x 18' 8", on Locust St., near Seventh St.; cost, about $5,500.

Plans are being made for a two-st'y frame cottage, 20' x 46', for E. J. Reischards, Esq., to be built on Fifth-Street Hill, at a cost of about $2,000.

W. H. Day, Esq., is having plans prepared for a two-st'y frame "Queen Anne" cottage, to be built on Grove St., at a cost of about $10,000.

F. D. Hyde is the architect of each of these.

PROPOSALS.

SCHOOL-HOUSES. [At Philadelphia, Pa.]

Sealed proposals, indorsed "Proposals for building Public School-Houses, viz.: on the north side of Spring Garden Street, below Seventeenth, and at Olney, in the Twenty-second Ward," will be received by the Committee on Property of the Board of Public Education, in Select Council Chamber, Chestnut St., above Fifth, **on Thursday, February 1, 1883, at 2 o'clock, P. M.**, for the erection of public school-houses on lots of ground situate on the north side of Spring Garden St., below Seventeenth, and at Olney, in the Twenty-second Ward, at which time said proposals will be opened by the Committee on Property.

Said school-houses to be built in accordance with the plans and specifications of L. H. Esler, Architect and Superintendent of School Buildings, to be seen at the office of the Board of Public Education, No. 713 Filbert St.

No bids will be considered unless accompanied by a certificate from the City Solicitor that the provisions of an ordinance approved May 25, 1860, have been complied with.

The committee reserve the right to reject any or all bids not deemed satisfactory.

By order of the Committee on Property.

H. W. HALLIWELL, Secretary.

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COURT-HOUSE. [At Jacksonville, Fla.]

Sealed bids will be received by the County Commissioners of Duval County, Florida, for furnishing the material and laying the foundations for County Court-House **until February 1, 1883**, the County Commissioners reserving the right to reject any or all bids.

Adequate security, over and above all homestead exemptions, with names of proposed securities to the amount of the bid, will be required.

Plans and specifications and form of bid can be seen at the office of Ellis & McClure, architects.

Bids, properly indorsed, to be handed to the County Clerk on or before the above date.

By order of the Board of County Commissioners.

T. E. BUCKMAN, County Clerk, etc.

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FURNITURE. [At New York, N. Y., and Danville, Va.]

OFFICE OF THE SECRETARY, TREASURY DEPARTMENT, WASHINGTON, D. C., January 12, 1883.

Sealed proposals will be received at this office **until 1 o'clock, P. M., of Saturday, February 3, 1883**, for manufacturing, delivering, and placing in position, in complete working order, certain furniture for the United States Barge Office at New York, N. Y., and United States Court-House and Post-Office at Danville, Va.

Upon application to this office detailed information will be furnished to furniture manufacturers desiring to submit proposals.

The Department reserves the right to reject any or all bids, or parts of any bid, and to waive defects.

WM. F. FOLGER, Secretary.

370

WATER-WORKS. [At Durango, Col.]

DURANGO, COL., December 28, 1882.

Sealed proposals for constructing water-works at this town will be received **until 12 M., February 1, 1883.** Proposals will be for two systems of water-works; gravity and turbine wheel with reservoir.

Specifications and details at office of City Engineer, Durango, Col.

The right to reject any and all bids is reserved by the town of Durango.

By order of the Board of Trustees.

370 F. W. BARNES, Clerk.

IRON BRIDGE. [At Nashua, N. H.]

CITY CLERK'S OFFICE, NASHUA, N. H.

The committee on highways and bridges of the city of Nashua invite proposals for a new iron bridge across the Nashua River, on Canal St. The span is about 152'; a contemplated roadway of 22', with sidewalks on both sides of the structure.

Committee reserve right to reject all bids. Proposals will be received **until February 1, 1883**, and should be addressed to

370 A. M. NORTON, Mayor.

HARDWARE. [At St. Louis, Mo.]

OFFICE OF SUPERVISING ARCHITECT, TREASURY DEPARTMENT, WASHINGTON, D. C., January 11, 1883.

Sealed proposals will be received at this office **until 12 M., on the 3d day of February, 1883**, for furnishing and delivering at the Treasury Building, Washington, D. C., all the hardware required for the custom-house and post-office at St. Louis, Mo., in accordance with specification and schedule, copies of which and any additional information may be had on application at this office or the office of the superintendent.

JAS. G. HILL, Supervising Architect.

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PROPOSALS.

BRIDGE MASONRY. [At La Passe, Can.]

Tenders will be received **up to the 8th of February next**, for the putting in the foundations and building the masonry for a bridge over the Ottawa River at La Passe; also, for the iron superstructure of same, erected complete to receive the track.

Plans and specifications may be seen on and after the 16th January next, at the contractor's office, No. 7 Place d'Armes Hill, Montreal.

C. N. ARMSTRONG, Contractor.

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POST-OFFICE FITTINGS. [At Belleville, Ont.]

DEPARTMENT OF PUBLIC WORKS, OTTAWA, January 9, 1883.

Sealed tenders, addressed to the undersigned, and indorsed "Tender for Fittings," will be received at this office **until Tuesday, the 6th day of February next**, for the new fittings required in the post-office, Belleville, Ont.

Plans and specifications can be seen and all necessary information obtained at the custom-house, Belleville, and at the Department of Public Works, Ottawa, on and after Tuesday, the 16th day of January.

Tenders must be made on the printed forms supplied.

Each tender must be accompanied by an accepted bank check, made payable to the order of the Hon. the Minister of Public Works, equal to five per cent of the amount of the tender, which will be forfeited if the party decline to enter into a contract when called on to do so, or if he fail to complete the work contracted for. If the tender be not accepted, the check will be returned.

The Department will not be bound to accept the lowest or any tender.

By order, F. H. ENNIS, Secretary.

371

LOCK. [On the Great Kanawha River, W. Va.]

U. S. ENGINEER OFFICE, CHARLESTON, KANAWHA CO., W. VA., December, 10, 1882.

Proposals for building lock No. 2, of the Great Kanawha River, will be received **until noon of January 31, 1883**, and opened immediately thereafter.

Blank forms and specifications can be had upon application at this office. E. H. RUFFNER,

370 Captain of Engineers.

DIKE. [At New Haven Harbor, Conn.]

U. S. ENGINEER OFFICE, NEW LONDON, CONN., Dec. 23, 1882.

Sealed proposals, in triplicate, will be received at this office **until 11 o'clock A. M. on the 23d day of January, 1883**, for constructing a dike in New Haven Harbor, Conn., to be built partly of rip-rap stone, partly of piles and stone.

Specifications and blank forms for proposals and for guaranty will be sent on application to this office.

J. W. BARLOW,

370 Major of Engineers.

IRON CHAINS. [Near Pittsburgh, Pa.]

U. S. ENGINEER OFFICE, 82 WEST THIRD ST., CINCINNATI, O., January 8, 1883.

Sealed proposals, in duplicate, will be received at this office **until 12 o'clock, noon, on Friday, the 16th day of February, 1883**, for furnishing and delivering at Davis Island Dam, on the Ohio River, five miles below Pittsburgh, Pa., about twenty-five thousand pounds of half-inch iron chains of the best quality. Specifications and all necessary information may be obtained on application to the undersigned or to Capt. F. A. Mahan, Corps of Engineers, P. O. Box 70, Pittsburgh, Pa. WM. E. MERRILL,

371 Major of Engineers.

COURT-HOUSE. [At Caledonia, Minn.]

Sealed proposals will be received by the building committee of the County Commissioners of Houston County, Minnesota, **until March 21, 1883**, at the office of the Auditor, in Caledonia, for the construction of a stone court-house for said county, according to plans and specifications of same now on file at the Auditor's office, and at the office of the architects, C. G. Maybury & Son, Winona, Minn., who will give any further information desired.

No bids will be received except for the whole building complete as specified.

The successful bidder will be required to give bonds in the sum of $5,000.

The right to reject any and all bids is reserved.

By order of Building Committee.

372 E. K. BOVERUD, County Auditor.

SCHOOL-HOUSE. [At Home City, O.]

Sealed proposals will be received by the Board of Education of the Delhi Station School District No. 6, **until Monday, February 5, 12 o'clock, M.**, for the materials and labor required for building an eight-room school-house in Home City, Hamilton County, O., according to plans and specifications on file at the office of S. Hannaford, architect, Room 18, Palace Hotel Building, Cincinnati, and at the office of Dr. John Campbell, Home City.

Bids must be on blank forms, to be obtained at either office.

Each bid must contain the name of every person interested therein, accompanied by a sufficient guaranty by some disinterested person in a penalty equal to the amount of the bid, that if the bid is accepted the contract will be entered into, and the performance of it properly secured.

All bids must be addressed to R. H. Gibson, Clerk of the Board, at Delhi, O., or 174 Elm St., Cincinnati, O.

The right is reserved to reject any or all bids.

By order of the Board of Education.

370 R. H. GIBSON, Clerk.

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MR. ESTERBROOK, of the New York Building Bureau, continues his efforts to improve the condition of hotels in the city in regard to safety from fire, meeting, however, as might be expected, with more or less opposition from the proprietors, all of whom think that their buildings are perfectly secure already. The proprietor of the Fifth Avenue Hotel, for instance, in which, if we are not mistaken, one or two poor servant-girls were burned to death some years ago, informs a *Mail* reporter that he believes the hotels of New York to be "especially safe," and considers that "no method of exterior escape could add to the safety of his house," on account of the width of the halls and stairways and the close watch that is kept. The proprietor of the Gilsey House, a well-known iron hotel on Broadway, considers the "needless anxiety about the safety of our hotels" to be "extremely foolish;" and the owner of the Sturtevant House regards his fire-escapes as "humbugs," and thinks that while they may be of use to "a person on the lower floors of a building who is too cowardly to jump to the ground," they are useless to those who may be caught in the upper stories by a conflagration. It is no doubt true that the directors of the large New York hotels have made great exertions within the last few years to prevent accidents from fire, but there is such a thing as being too confident, and it is said that the proprietors of the Newhall House in Milwaukee, which is now denounced on all sides as a "death-trap," a "tinder-box," and so on, kept a standing advertisement in the newspapers, calling attention to their "special precautions against fire," and the "perfect safety" of their building, with, as it seemed, about as much justification as the owner of the New York storage warehouse had, whose sign "Absolutely Fireproof," displayed itself on a fragment of wall above the ruins of a structure which was completely and quickly destroyed under circumstances which should not have compromised in the least the safety of a building planned with even a moderate use of the well-known and proper precautions against fire.

IT is of some interest to architects to know that Mr. Esterbrook's directions in regard to hotels have taken the shape in many instances of peremptory orders to place balconies and fire-escape ladders or stairways on the principal fronts of the building. On the Broadway side of the Sturtevant House, for instance, three lines of fire-escapes are required, with three balconies on each floor, and on the Twenty-ninth Street side of the same building two more lines of escapes are called for. Iron stairways are to connect the balconies in the several stories, and an iron drop-ladder is to extend from each lower balcony to the street. Such additions as these to the ornamentation of elaborate hotel-fronts will be anything but welcome to their designers, and it is not unlikely that the profession may be requested to join in a remonstrance against disfigurements of the kind. If so, we hope that the request will be disregarded, in the interest of the architects of future buildings, who will gain by the trifling annoyance caused to one or two of their brethren a powerful argument to support the efforts which all of them have occasion to make in favor of a more substantial mode of construction than is now in use.

BY Act of Congress, the sum of ten thousand dollars was appropriated for the year ending June 30, 1883, to be used for the purpose of "caring for, preserving and operating the United States Testing Machine at the Watertown arsenal," and in furtherance of this purpose the Chief of Ordnance, General Benét, has arranged for making a certain number of tests of materials at the public expense. As the appropriation is small, the bill making it specifies that the Chief of Ordnance may confer with the American Society of Civil Engineers in regard to the preparation of a programme of the tests to be made during the present year, in order that the results, instead of containing a mass of random information, may be limited to a single class of stresses. Next year, in the same way, a second class of strains can be applied, and a comprehensive series of constants of the greatest value will thus be built up. In accordance with this permission a programme was drawn up and accepted, by which the official investigation for the present year is limited to the compression members of structures, and a general invitation is given to railroad companies, bridge engineers, architects, and other persons interested in the use of structural material strained in compression to coöperate in making the tests. The Ordnance Department offers, if a test is desired of members from buildings in process of construction, or special shapes rolled for such purposes, to pay the freight to Watertown on specimens submitted, test them properly, return the fragments, and furnish the shipper with an early special report of results, giving him also an opportunity of sending duplicate pieces for a second test, if he has reason to believe that the specimens first tried were defective. Besides this, a copy of the account of all tests and results is to be furnished to the American Society of Civil Engineers, for publication and distribution.

EVERY one does not realize the immense importance of these tests to every department of the arts of construction. Already, within the three years that the Emery machine has been in use, it has effected a wonderful change in the rules for strength of materials lately regarded as infallible, and it is destined to have a still greater influence as its powers are applied to the trial of different materials. To take a single instance of what it has already accomplished, it is only necessary to mention the tests of wooden posts recently made by Professor Lanza, of the Massachusetts Institute of Technology, which have proved that the formulæ of Hodgkinson in regard to columns more than twelve diameters long, deduced from tests of small models, are quite inapplicable to timbers of the sizes actually used in buildings, and that new formulæ, based on very different principles, must henceforth be employed in this important detail of practice. Another example, which indicates still more strongly the unreliable character of the constants now universally used in architectural and engineering practice, is to be found in the trial of a number of large steel bolts, every one of which broke under a tensile strain of less than forty thousand pounds per square inch, while fragments, broken from the same bolts, showed under many tests in small machines a tensile strength in no case so low as ninety thousand pounds per square inch, while most of the trials gave a resistance of one hundred and ten to one hundred and twenty thousand pounds. The ordinary formulæ, based on tests of small pieces would certainly have given something like the latter as the constant for tensile strength, and an over-economical engineer, stretching the factor of safety to its utmost extent, might put such bolts in positions where they would surely break as soon as their load came to be placed upon them. The only thing to be regretted is that machines of equal power are not now available for testing transverse and torsional resistance, neither of which can be tried in the Watertown apparatus. That there is pressing need of such machines is shown by the result of some transverse tests of spruce timbers, conducted by Professor Lanza with an apparatus of somewhat limited capacity fitted up by himself, which gave an average modulus of rupture for beams of the sizes commonly used in practice amounting to little more than one-half that deduced from experiments with

small sticks, and presented in all text-books now in use as the proper constant. There is something rather startling in the idea that instead of four, five or six, as we supposed, the factor of safety in our structures of spruce is really but two or three; and if tests of iron and steel in large pieces should show similar results, the calculations of engineers will be still more embarrassed.

THE Western Union Telegr; ; h Company has, although with many misgivings, undertaken to place its main wires in the city of New York underground, or at least out of reach of harm. A contract has already been made for a tube extending under Broadway from the main office of the company, near Wall Street, to Twenty-third Street, which is to contain two hundred wires. Beyond Twenty-third Street it is intended to carry the wires along the structure of the elevated railway to the northern extremity of the city, where they will be dispersed in various directions. The officers of the company acknowledge the advantage of this arrangement in point of safety from injury by weather, as well as of convenience, but fear that the grouping of wires closely in a tube will produce an unfavorable action between them, and that an accidental loss of insulation of one may make all the others useless for a time. It is much to be hoped that their anticipations may not be realized, and that the experiment may prove so successful as to lead to the adoption of similar measures by all owners of electric wires.

SOME rather unreasonable comments are being made upon the efforts of the Department of the Interior to provide for the comfort of visitors to the Yellowstone National Park. The extension of two railroads having made the Park easily accessible to tourists, the Department has been obliged to consider the question of furnishing hotel accommodation for them, a matter as important to the tourist as to the guardians of the public pleasure-ground, whose beauty must otherwise soon be ruined by the malice or carelessness of unwatched camping parties. Two expedients suggested themselves, of which one, the least promising, was to allow small hotel-keepers to erect houses of dimensions suited to their financial capacity; and the other, to make concessions of territory to persons or corporations possessing the means and disposition for maintaining, not a single small inn, but two or more, of the largest size, which could be carried on, like those of most watering-places, under a combined and extensive management. There is no question, we think, that the proprietors of great establishments are more likely to feel it for their interest to keep the natural attractions around them, on which the success of their business depends, in good order, than persons whose views would probably be less enlarged, as the amount of property which they had at stake was less; and it is equally evident that a rich corporation, even supposing its disposition to be no more favorable, would be better able than a small proprietor to keep the necessary watch, and take the proper steps for protecting anything which might need to be guarded. For this reason the Department with good reason chose the latter course, and contracts have already been made with responsible parties in accordance with that plan.

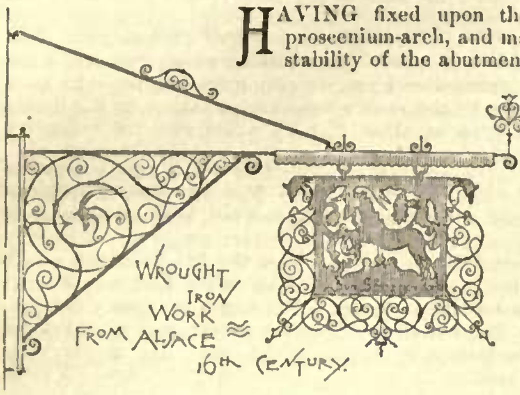
THESE contracts provide that in return for the concession of certain tracts of land during a limited term of years, the parties receiving them shall build and carry on a specified number of large hotels, in locations agreed upon, subject to the supervision of government officials; and it is further agreed that travellers shall be entertained in the hotels at a fixed rate of charges, which is also to be subject to the approval and revision of the officers of the Department. Together with this, the territory adjacent to the hotels is to be suitably cared for, and as a matter of course, a certain amount of farming-land is to be attached to each hotel. This arrangement, which seems to the ordinary mind admirably adapted to fulfil its purpose in the best manner, excites the indignation of the New York *Times*, which characterizes the government contractors as "a gang of speculators," and accuses them of desiring, by reason of their "private greed and extortion," to compel visitors to the Park to patronize their mammoth hotels as the necessary condition of being allowed to approach "within seeing distance" of the natural curiosities and beauties of the place. As vast tracts of the Park woodlands have already been destroyed by fires kindled by camping parties, and the volcanic geysers are nearly choked with the stones and tree-trunks thrown into them by similar careless persons, it certainly seems that a peremptory rule requiring all tourists to report themselves at the hotels, even if they choose to live in some less expensive place, might be of great value as a protection, and unless the hotel-proprietors should endeavor to force any one to become their unwilling guest, or to shut out the public from the grounds which they bear the expense of keeping in order, neither of which they are at all likely to attempt, it certainly seems as if they deserved more consideration than they now get.

A RATHER startling story has appeared in some of the daily papers, to the effect that Sir Edward Watkin, the enthusiastic promoter of the scheme for building a tunnel under the English Channel, which was so decisively checked by the British Government not long ago, has had the hardihood to disregard the repeated and stern orders of the Government, and is secretly at work in the tunnel, forcing the heading with all possible speed toward the French coast. If this is true, his operations have probably by this time carried him beyond the English boundary, but if his Government can no longer prevent him from digging under the bed of the high seas, it can at least effectually oppose the use of the English end of the tunnel, without which it will be of no use to any one. Sir Edward and his friends, if they are really at work as is said, probably believe that the Government, however strictly it may prohibit the carrying out of any given work, will hardly go so far as to destroy what has already been done, and that after the tunnel is completed, although they may be forced to leave it unused for a time, public opinion will ultimately secure for them permission to open it for traffic.

A STORY is going the rounds of the press, purporting to be derived from the statement of a friend of the late Henri Giffard, the distinguished and high-minded French inventor whose melancholy death occurred some months ago, to the effect that Giffard, who was well known as an enthusiastic aeronaut and believer in the practicability of aerial navigation, had been studying this subject for many months before his decease, and had at last discovered the means for the immediate realization of his dreams; but that further reflection upon the consequences of his discovery had shown him plainly that the inevitable result would be the destruction of civilization, and the conviction of this ended in destroying his reason. Although this story has rather an improbable sound, there is certainly room for much interesting speculation upon the probable results of a successful attempt to navigate the air, such as we have every reason to anticipate before many years. The first consideration which would occur to most persons, that of the application of air-ships to warlike purposes, is certainly an important one, for a craft of this kind, armed with a few barrels of high explosives, would be an engine of destruction far more terrible than any that has yet been conceived. Such a contrivance, impelled by the simplest means, and manned by half a dozen persons, could in a few nights reduce all the cities in Europe to heaps of ruins, without warning or possibility of defence for their inhabitants. Whether any malice less atrocious than that of an O'Donovan Rossa or a Russian nihilist would condescend to the use of such inhuman agencies, even in warfare, is doubtful, but the temptation would in some cases be strong, and if it were yielded to, the habits of the world in regard to the distribution of population would soon be profoundly modified.

A SUGGESTION for the protection of buildings in districts subject to wind-storms is found in a patent which has just been taken out for a device consisting mainly in two wire ropes, with anchors, and turn-buckles for tightening, which are to be carried over the roof of a house, and will certainly prevent it from blowing away, if the anchorage is good and the ropes strong. The principle itself is by no means new, the Summit House on Mount Washington, in New Hampshire, having been secured for many years by chains carried over the roof, and anchored to the rocks on each side, but the method may be indefinitely improved. The anchorages, if connection can be made with a proper "ground" of moist earth or water, may be used as lightning-conductors, and armed with points where they cross the ridge. Concerning the appearance of the patented device, as exhibited in a cut in the *Scientific American*, the less said the better, but it might be possible to carry the ropes or chains inside the frame, or at least under the roof-boards, so as to disguise or conceal them without lessening their effect.

BUILDING SUPERINTENDENCE. — XXVI.



HAVING fixed upon the shape of the proscenium-arch, and made sure of the stability of the abutments, we will next determine the construction of the roof, which is intimately connected with the disposition of the wall supporting it. For the sake of simplicity, we decide to make the ridge of the roof level throughout, varying only the interior construction to suit the means of support at our disposal, or other requirements.

Over the stage, where no sacrifice need be made to appearance, we will use the simplest and cheapest devices, covering the central span, of 45 feet, with a truss of the form shown in Figure 180, and the rooms at the side with plain lean-to roofs, with tie-beams, and uprights next the wall, to prevent lateral pressure upon it, and a strut to prevent the sagging of the principal rafter. This rafter will form a continuation of the rafter of main truss, so as to bring the surface of the roof in one plane. The auditorium will be covered by an ornamental roof in one span, and the upper portion of this will be continued over the gallery at the rear, the ante-rooms on each side of the gallery being covered by the gallery floor.

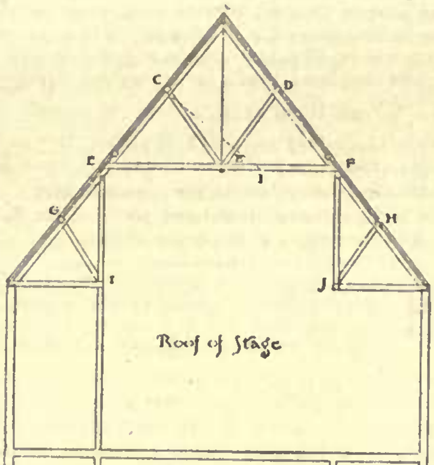


Fig. 180.

We will first investigate the simplest roofing, that over the stage. As both the large and small trusses are furnished with horizontal ties at the foot, they can have no tendency to spread, and therefore exert no thrust upon the walls; so that we shall only need to ascertain the strains upon the timbers and determine the necessary sizes. This we will do here only for the central truss, $A\ E\ F$, the principle being the same for all.

We have first to find the total weight which the roof must sustain. The length of the rafter $A\ E$ is by the scale 30 feet, and as the trusses are spaced 12 feet apart from centres, this rafter will have to sustain $12 \times 30 = 360$ square feet of roofing, and whatever extraneous pressure there may be upon this area, such as that of snow and wind. The other rafter, $A\ F$, will have the same stress to bear.

It will be best to consider first the vertical stress produced by the weight of the roof, including that of snow upon it, taking afterwards the oblique stress caused by wind. The weight of the roof itself, which consists simply of trusses, purlins, common rafters, boarding and slate, without plastering beneath it, may be taken at 15 pounds to the square foot. If the roof were flat, or nearly so, a load of wet snow might occasionally be added to this, amounting to forty pounds per square foot as a maximum, but our roof being inclined at an angle of about 52° with the horizon, the snow falling upon it would slide off as it accumulated, and a snow load of 15 pounds to the foot may safely be taken as the greatest to which it will ever be subjected. This makes the total weight per square foot of roofing 30 pounds, and the rafter $A\ E$ must therefore be calculated to sustain a vertical stress of $360 \times 30 = 10800$ pounds. The load on the other rafter, $A\ F$, will be the same, making the whole vertical pressure on the truss 21600 pounds. In Figure 181, express this weight by a vertical line from A to B, at any scale, say 1000 pounds to the inch. Find the centre, C, of this line. As the truss and its load are kept up by the supports on which they rest, the upward force of these supports, or, as we should say, their reaction, is just equal to the weight imposed upon them; or, in the diagram, half the roof $A\ F$ and its load presses downward with the force $A\ C$, and is held up by the force $C\ A$, while the weight on the other half, $A\ E$, is $C\ B$, and is sustained by $B\ C$.

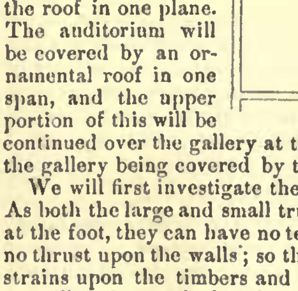


Fig. 181.

We must now make another division of the vertical line $A\ B$, to indicate the proportionate part of the whole weight borne by each joint in the truss. Looking first at the rafter $A\ F$, we see that the portion D must suffer twice as much strain as either F or A, because it sustains an area of roofing extending on each side to a point midway between it and the next joint, while A and F being held, one by the opposing rafter and the other by the support at the foot, each carry only the portion between them and the point half-way to D. Hence in the diagram, if $A\ C$ expresses the whole weight on $A\ F$, $A\ K$ will indicate the portion borne at F, $K\ I$ will show that upon D, and $I\ C$ that upon A. Then $C\ G$ will show, in the same way, the strain at A upon the other rafter, $A\ E$; GE that upon C, and $E\ B$ that on E. We have now all the data from which to determine the stresses on the other pieces of the truss, each of which plays a part in sustaining the total load. Beginning at the foot F, of the rafter $A\ F$, we find it to be the point of application of four different forces, the first being the reaction of the support on which the truss rests at that point, indicated by $C\ A$ on the stress diagram; the second being its own portion of the weight, shown, as we have just seen, by $A\ K$; the third being an oblique pressure passing down the rafter, and the fourth a horizontal pull from the tie-beam. The direction and amount of each of these may be obtained from the diagram as follows: Starting from C, we pass upward to A, over the distance which represents the reaction of the support F, and in the direction of that reaction; then down again to K, over the space, and in the direction, corresponding to the share of the vertical load supported by the joint F: from K we draw a line, $K\ D$, parallel with the direction of the rafter $A\ F$, of such length that another line, drawn from its further extremity, parallel with the direction of the tie-beam $F\ E$, will just meet the point C, from which we started. The length of the line $K\ D$, according to the scale to which the diagram is drawn, will then give the number of pounds of longitudinal stress along the rafter from D to F, and $D\ C$ will be the tensile strain upon the tie-beam between F and B.

To distinguish between the tensile and compressive strains we will indicate the former in the diagram by a light line, and the latter by a heavy line as shown.

In the same way we find the stresses upon the pieces around the joint D, in the middle of the rafter $A\ F$. We know already the stress upon the piece $D\ F$, which we found just now to be $K\ D$ on the diagram; but as the compressive strain upon this piece, which was a downward push upon the joint F, is an upward push upon the joint D, we must now trace it in a direction reversed from that previously found, and starting from D on the diagram, follow it upward to K. From K we have another known force, the vertical load upon the joint D, which we ascertained at the beginning to be equal to $K\ I$, or twice as great as $A\ K$. Following this strain, then, downward to I, we have left two unknown forces, that on the upper portion of the rafter $D\ A$, and on the strut $D\ B$, both of which are applied at D, the joint whose equilibrium we are tracing. These are found in the same way as before, drawing $I\ H$ parallel to $A\ D$, until $H\ D$ parallel to $B\ D$ will close on D. $H\ D$ is then the compressive strain on the strut, and $I\ H$ that on the upper portion of the rafter, and both are to be indicated by heavy lines.

The next strain to be determined is that on the king-rod $A\ B$. We have assumed that the vertical pressures are the same on each side of the roof, and the stress diagram will therefore be symmetrical, and $G\ F$ will represent the stress on one upper rafter, and $H\ I$ that on the other. At the joint A, these two stresses, together with the vertical load $I\ C + C\ G$, or $I\ G$ and the pull of the king-rod, include all the forces applied at that point, and starting with the known stresses $H\ I$ and $I\ G$, $G\ F$, symmetrical with $H\ I$, will be the strain on the upper rafter $C\ A$, and $F\ H$, drawn parallel with the king-rod, and connecting F and H, will represent the tensile strain on the king-rod.

Measuring with the scale the forces thus indicated, we shall find as follows: —

STRESSES FOR VERTICAL LOAD.

Tie	6400 lbs.	Tension.
King-Rod	6000 "	"
Lower Rafter	10300 "	Compression.
Upper Rafter	7000 "	"
Strut	3600 "	"

We have now to consider an additional series of strains, — those due to wind-pressure. Of course the wind may blow upon either side of the roof, but by calculating the stresses due to a pressure on one side, we shall have all the data required for extending it to the other.

We will suppose the wind to blow from the left in Figure 180. As the general direction of wind-movement is nearly horizontal, the maximum pressure in a direction normal to the plane of the rafters occasioned by it increases as the pitch of any given roof rises, and in a certain ratio to the angle which the rafters make with the horizon. The angle of the present roof being 52° it will be safe to assume a maximum wind-pressure in a direction normal to that inclination of 44 pounds to the square foot, which will give as the wind-pressure supported by the rafter $A\ E$ in Figure 180, which is 30 feet long and spaced 12 feet from the next rafter, $30 \times 12 \times 44 = 15840$ pounds. This, as the wind will only blow on one side at a time wil

give the total wind-pressure on the whole roof, although its *direction* may be reversed. We lay this off in Figure 182 from A to B, at the same scale as in the preceding diagram, $A\ B$ being drawn in a direction perpendicular to the inclination of the left-hand rafter.

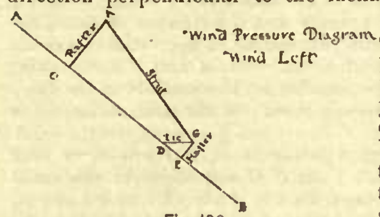


Fig. 182.

The next thing is to lay off on $A\ B$ the points showing the proportionate portions of the pressure borne at the several joints, and also the reactions of the supports at E and F. We can easily see that, as in the case of vertical pressure, the joint C bears half the strain on the rafter, A and E bearing one-quarter each, which will give $A\ C$ on the diagram as the pressure at A, $C\ E$ as the pressure at C, and $E\ B$ at E. To find the reactions of the supports we must consider that the tendency of the oblique force of the wind on the whole truss, $A\ E\ F$ in Figure 180, is to turn it about the point E, with a leverage which will be proportional to the distance from E of C, which is the centre of the rafter, and forms the point at which the pressure, uniformly distributed over the roof-surface, may be assumed to be concentrated. We can see that the support F will, with this particular form of roof, be most severely strained, and the exact proportion between the loads borne by each support can be readily found by drawing from C a line perpendicular to the rafter $A\ E$, and striking the straight line connecting the points of support at 1; then measuring the distances 1 F and 1 E, which will give, *inversely*, the relative pressures borne by F and E. In this case 1 F is $\frac{1}{4}$ of the whole distance $E\ F$, and 1 E is $\frac{3}{4}$ of the same, from which we infer that F bears $\frac{3}{4}$ of the wind-pressure, and E only $\frac{1}{4}$. Applying this to Figure 182, we divide $A\ B$ by the point D, at $\frac{1}{4}$ the distance from B to A. Then $B\ D$ will represent the reaction of the support E, and $D\ A$ that of the support F. Beginning with the joint E of Figure 180 we trace the stresses in the same way as before with vertical strains. From E on the diagram we pass down to B for the direct pressure, then upward to D for the reaction of the support E, then horizontally to G for the tension on the tie-beam, and down, parallel with the rafter, to E, the point of beginning, for the compressive strain on the rafter at its foot.

To find the strains at the joint C, in the middle of the rafter, we start at C in the diagram and pass downward to E for the proportion of the wind-pressure borne at C, then up to G for the reaction of the lower portion of the rafter, then upward, parallel with the direction of the strut, to F, until a line drawn downward from F, parallel with the upper portion of the rafter, will close on C, the point of beginning. This will give us the stress due to wind upon each portion of the rafter, the strut, and the portion of the tie-beam nearest the wind, as follows, scaling them from the diagram.

STRESSES FOR WIND-PRESSURE. WIND LEFT.

Left-Hand Part of Tie	1800 lbs.	Tension.
Left Lower Rafter	900 "	Compression.
" Upper Rafter	3300 "	"
Left-Hand Strut	8300 "	"

All these stresses would be reversed by a change in the direction of the wind.

There are still other strains to be found on the other pieces of the truss, but the reader can easily finish the diagram for himself. It is enough to say that the next point to be investigated is that at A in Figure 180, then D, and then F, and finally, the investigation of B will serve to check the correctness of the others. It will be found that the strut $B\ D$ receives no stress of any kind from wind-pressure on the opposite side; that the portion $B\ F$ of the tie-beam suffers a *compressive* strain of about 3300 pounds; that the rafter $A\ F$ is equally strained throughout its whole length with a compressive force of about 8000 pounds, and the king-rod $A\ B$ is subjected to a tensile stress of 6,500 pounds.

As the tie-beam $E\ F$ is strained by tension, to the amount of 1800 pounds, at one end, and by a compression of 3300 pounds at the other, it would seem that the net effect of the pressure would be a compressive stress equivalent to the difference between the two, or 1500 pounds. This, is, however, an unsafe inference, the two kinds of stresses acting to a certain extent separately, instead of neutralizing each other, so that the prudent method is to take the largest amount of stress of the principal kind, without deduction for the neutralizing effect of the opposing, but inferior forces. In the case of the rafters, which are all strained in the same way, but of which we find that the one away from the wind is the most strained, we will provide for resisting the greater stress, which will make us safe against the lesser one. This will give us a corrected table of wind-pressure strains, which we will place side-by-side with those due to vertical pressure, adding them together to find the sums which will give us the total stress acting *along* each piece which that piece must be calculated to bear safely. For shortness we will mark tension as — and compression as +.

STRESSES ON TRUSS. — *Vertical Load and Wind-Pressure.*

Piece.	Vertical Load. lbs.	Wind-Pressure. lbs.	Total. lbs.
Tie, E F, (Fig. 180.)	— 6,400	— 1,800	— 8,200
King-Rod, A B	— 6,000	— 6,500	—12,500
Each Lower Rafter, C E, D F	+10,300	+ 8,000	+18,300
Each Upper Rafter, A C, A D	+ 7,000	+ 8,000	+15,000
Each Strut, B C, B D	+ 3,600	+ 8,300	+11,900

We can now obtain the sizes of the timbers and rods which will safely sustain these stresses.

The tie-beam, $E\ F$, suffers a tensile strain of 8200 pounds. The safe tensile strength of spruce timber, which we suppose to be the material of the truss, should not, for such a roof, be taken at more than 1000 pounds to the square inch, and a timber of 8.2 square inches sectional area, or about 2″ x 4″, would give the resistance required.

There is, however, another consideration which enters into the calculation of the size of the tie-beam. Not only does it keep the feet of the rafters of the truss from spreading, but, in virtue of its horizontal position, it is also a beam, or rather a pair of beams, each having a span equal to the distance from the king-rod to the wall-plate, about 20 feet, and burdened with its own weight, which tends to break it by a transverse strain. This strain is entirely independent of the longitudinal stress along the timber, and must be provided against separately, by increasing the size of the timber, so as to give additional fibres for resisting the bending strain, which those fibres engaged in tensile resistance to the longitudinal stress cannot deal with. We will try, therefore, a 3″ x 4″ timber in place of 2″ x 4″, and see if it gives us strength to meet all the stresses, transverse as well as longitudinal. Supposing 2″ x 4″ of this to be occupied in resisting the direct tensile force, we shall have remaining a beam 1″ x 4″, 20 feet long, which must sustain the weight of the entire timber, 3″ x 4″ x 20″ which, at 45 pounds to the cubic foot, will be 75 pounds, uniformly distributed over the beam.

The simplest formula for transverse strength of rectangular beams is $\frac{b\,d^2\,C}{s\,L} = W$ in which

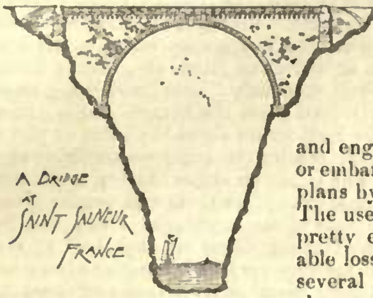
b is breadth of beam in inches.
d is depth " " "
C is a constant, which for spruce is 450.
s is the factor of safety, which should be 6.
L is the length of the beam in feet.
W is the safe centre load.

Applying this, and remembering that the distributed load may be with safety twice as great as the centre load, we shall have $\frac{1 \times 4^2 \times 450 \times 2}{6 \times 20} = 120$ pounds safe distributed load. As the weight of the timber is only 75 pounds, we have here a surplus of transverse strength of about 60 per cent, but it is hardly worth while to make the stick any smaller. In fact, wooden tie-beams are ordinarily made of far greater dimensions than this, and with reason, for they are very liable to be used for supporting the weight of partitions either above or below, or are subjected to other extraneous transverse strains which they are less able to resist than other beams, which have no special work of their own to do, while their strength is further impaired by the mortises by which the rafters and king-rod are framed into them. The king-rod, $A\ B$, is of wrought-iron, and endures a simple tensile stress of 12500 pounds. The usual estimate for the safe tensile strength of wrought-iron is 10000 pounds per square inch, and as the area of a circle is .7854 of that of the square in which it is inscribed, the diameter of a round rod to hold safely 12500 pounds will be $\sqrt{\frac{12500}{10000 \times .7854}} = \sqrt{1.59} = 1.26$, or about $1\frac{1}{4}$ inches.

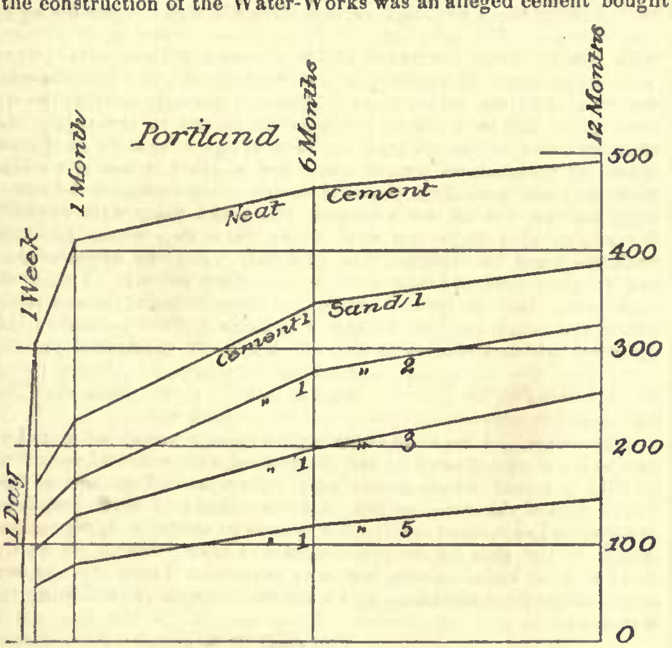
The upper and lower rafters and the struts are all subjected to compression, and their dimensions will be found by the formulas for wooden columns. Taking the lower rafters first, with a stress of 18300 pounds, we may, as they are only about 15 feet long, take the compressive strain which they will bear safely in the direction of their length at 400 pounds per square inch of sectional area. To sustain 18300 pounds will therefore be required a timber of 46 square inches sectional area, and we may use a stick 4″ x 12″, 5″ x 10″, or 6″ x 8″, as may be most convenient. As in the case of the tie-beam, a small surplus of strength must be reserved to resist the transverse strain due to the weight of the rafter itself, which tends to bend it inward, but the slight excess of these dimensions over those strictly necessary will be sufficient for the purpose. If, however, a purlin were placed, as is often the case, bearing directly on the rafter, midway between its foot and the strut, a very important transverse strain, equal to the wind-pressure on a portion of the roof $7\frac{1}{2}$ feet wide and 12 feet long, together with the component normal to the direction of the rafter of the vertical pressure due to the weight of the same portion of the roof and its load of snow, amounting in all to about 6000 pounds, would have to be resisted by the rafter, acting as a beam loaded at the centre, in addition to the compressive stress acting in the direction of its length, and its dimensions would need to be increased accordingly.

The same observations apply to the upper rafter, and even to the strut, in some instances, but if we are sure that we will not forget this caution in case of need, we may, for the present, continue to study our truss as it is intended to be built, without transverse strains on any of the pieces except those due to their own weight. The upper rafter, having to sustain a compressive strain of 15000 pounds will then need, by the same rule, a sectional area of $37\frac{1}{2}$ square inches, and a 4″ x 10″, 5″ x 8″ or 6″ x 7″ stick would give the required strength with a surplus for resisting the transverse strain of its own weight. The strut, which sustains 11900 pounds, may be 4″ x 8″ or 6″ x 6″. This completes the schedule of timbers for the trusses over the stage.

CEMENT TESTING.



The necessity for a careful testing of cement, before using, must be apparent to all who have given the subject much attention, and especially to those architects and engineers who have been delayed or embarrassed in the execution of their plans by an article of inferior quality. The use of poor cement is generally pretty expensive, involving considerable loss of time and waste of money, several cases having come under the observation of the writer where the work in which it had been placed had to be taken up and relaid in good cement in order to secure satisfactory results. A recent case showing the necessity for testing was the building of some large works connected with a prominent copper mine at the West, in the construction of which a local cement was used, but proved of such poor quality that when finished the work had to be broken up and English Portland used, after being subjected to tests to insure its good quality. Had the local cement been tested before using, its worthlessness would have been made apparent. The writer, who has had some eight years' experience in the testing of cements, on the construction of the Sudbury River Conduit and on the Improved Sewerage Works of Boston, has seen many curious articles offered as cement. Some two years since, a patent cement was offered the City and tested by the writer. With the sample to be tested came a circular setting forth its good qualities and containing testimonials from parties who had used it. It was subjected to the usual tests and for a time gave promise of fair results. At the end of about three months, however, the cement, which, after it had hardened in air, had been kept in water, began to swell and crack, and at the end of six months it was reduced to an inert powder, in which condition it still remains. The effect of using such a cement can readily be imagined. Another article, which came under the hands of the writer during the construction of the Water-Works was an alleged cement bought



by one of the contractors at a price much below that of the so-called standard brands, from a party who desired to place his wares in the Boston market. It was remarkably quick-setting, setting up, when mixed neat, in about two minutes, and becoming so hot as to be almost unbearable. Some seventy-five barrels of this cement were tested and not a single sample, one being taken from each barrel, was found that did not, after being moulded and allowed to harden in air, go to pieces when placed in water. It was of course rejected.

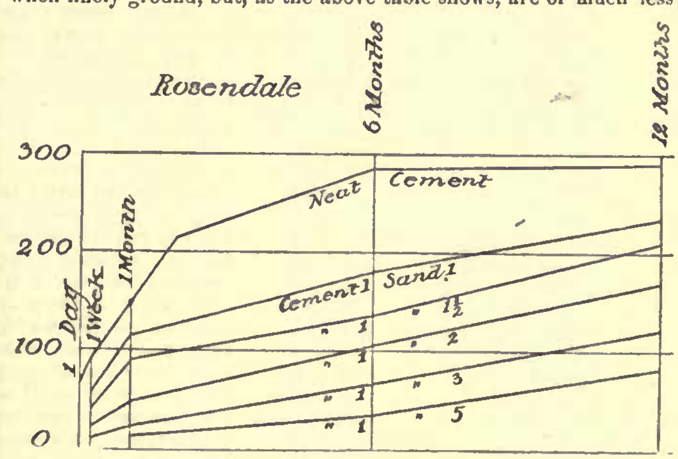
A still more recent case was that of a lot of cement offered the City and tested by the writer. Samples were taken from fifteen barrels for inspection, and subjected to the following tests to find its tensile strength, mixed neat and with sand — neat, at the end of 24 and 48 hours, and with sand (1½ to 1) at the end of 7 days — also the percentage retained by passing a given quantity through a sieve containing 2500 meshes per square inch. A briquette, mixed neat, was made from each sample, and ten briquettes were made mixed with sand, in the proportion mentioned. Each sample was mixed separately and was allowed to harden thoroughly before being placed in water. Four of the neat briquettes were taken from the water at the end of 23 hours and allowed to dry one hour before being broken, and then gave a tensile strength of only 28 pounds per square inch. At the end of 48 hours, allowing one hour for the cement to dry, the average tensile strength of ten briquettes, per square inch, was but 20 pounds. The average percentage retained by the sieve was 18, the maximum being 33 and the minimum 9 per cent. A comparison of these figures with those of the table annexed will be found instructive. Of the fifteen briquettes mixed neat, four cracked badly and one went to pieces when placed in water. Of those mixed with sand, all but three slacked, or were so weak as to break in handling at the end of seven days, the average tensile strength of the three remaining being but 10 pounds per square inch. Such a cement would be pretty costly at any price, and yet had its bad character not been shown by inspection, it would doubtless have been used to a considerable extent, only to have caused trouble and perhaps disaster.

During the time that the Improved Sewerage Works have been under construction, nearly 40,000 tests of cement have been made, principally of that which has been used in the work and for experimental purposes. This has had the effect generally of preventing poor cement being offered, the manufacturers knowing that an article not coming up to the standard adopted will be promptly rejected. In making contracts for cement for this work, it is especially stipulated that it shall be finely ground, experiments having proved that the particles retained in a 2500-mesh sieve have little or no setting qualities, and are practically of little better value than so much sand. All cements, when this residuum averages over ten per cent, are rejected.

To show the value of a finely-ground cement, one of a series of experiments made to determine this question is here given. A Portland cement was used as received from the manufacturer, which contained about 32 per cent of residuum when tested with a sieve containing 14400 meshes per square inch. This was compared with the same cement which had passed through this sieve, the coarse particles retained in the sieve being rejected. These cements were mixed with sand 1 to 2 and 1 to 3 and the results given.

	1 — 2				1 — 3			
	One Week.	One Month.	6 Months.	12 Months.	One Week.	One Month.	6 Months.	12 Months.
Common Cement, . . .	139	201	324	343	86	142	253	271
Fine " . . .	187	275	346	434	132	201	283	322

The briquettes were made at the same time and under the same conditions. The figures represent the average tensile strength per square inch of ten briquettes. Cements ground coarse, especially Portland, show a much higher tensile strength when mixed neat than when finely ground, but, as the above table shows, are of much less



value when mixed with sand. The real value of cement is in the sand it will carry, experience showing that a cement of which 9 per cent will be retained in a 2500-mesh sieve, mixed with sand in the proportion of 1 to 1½ and 1 to 2, will at the end of 7 days show a tensile strength 70 per cent higher than a mortar mixed in the same proportions, the cement of which leaves 17 per cent in the sieve. It is thus obvious that fine-ground cement is the cheapest to buy, yet the two cements from which these experiments were made were selling for the same price. A much more economical method of making cement-mortar than the system now in vogue of adding sand in fixed quantities to cement, regardless of the power to carry it, would be to proportion the amount of sand used to the fineness of the cement, a finely-ground article carrying much more and giving equally good results than a coarser cement. The result would be to use less cement and more sand, thereby making a considerable saving of expense.

Among other experiments made by the writer was one which will cause some surprise to people familiar with cements, in which it has been proved that the adulteration of Portland cement with a certain per cent of clay actually benefits the cement. The cement used was an English Portland of good quality, and the clay of ordinary quality taken from an excavation in one of the streets. Before mixing with the cement, the clay was thoroughly dried and pounded in a mortar, so that it would pass through a sieve containing 576 meshes per square inch, then added, so that three lots were made containing

respectively 10, 20 and 30 per cent in clay of the weight of the cement used in making the experiments. The table annexed gives the average tensile strength per square inch of five briquettes. Each lot was mixed with sand in the proportion of 1 to 2.

	One Week.	One Month.	6 Months.	12 Months.
Common Cement, ...	144	167	294	335
+ 10% clay, ...	185	263	345	305
+ 20% "	192	271	350	422
+ 30% "	158	238	320	384

It will be noticed that in almost every case the addition of clay has had the effect of increasing the tensile strength of the mortar.

To find a cement that will not expand after setting has been the subject of a number of experiments, the chimney test being chiefly used, but as yet, nothing has been found that has not expanded sufficiently to break or rather to crack the glass, after a few days' set. The necessity of testing cement before it is used is again urged upon those whose business it is to see that only stock of good quality is used, and who desire to have first-class work. The small expense attending it will be more than returned in the saving of time and money wasted on a poor article. The result of inspection on the construction of a certain public work has been to increase the tensile strength of Rosendale cement offered for it, from about 40 pounds per square inch in 1878 to 75 pounds in 1882. In order to secure a good article and to drive poor stuff out of the market, cement should be bought, or allowed to be used in the construction of works, only after it has passed satisfactory tests. To most contractors, a barrel of cement is a barrel of cement, regardless of its quality, and means only that article that can be bought for the least possible money, and as most of the work in which it is placed is covered, its worthlessness remains undiscovered until the cracking or settling of the work announces its presence. As "eternal vigilance is the price of liberty," so is continual testing a requisite for a good cement.

WM. J. CONDON.

BUILDERS' SCAFFOLDING. — VIII.

It may be observed in connection with the subject of bracing structures, that the more open the angle against which the *push*-force is exerted, the greater are the strains that are brought on the *struts* or *ties* which form the sides of or enclose the angle, as the rafters in a flat double-pitch roof, or a similar figure reversed; and as any variation in these angles (meaning thereby the circular extent of opening lying between the lines of direction of adjacent meeting pieces) which these pieces make with each other are of vital importance in regulating the magnitude or proportional intensities of active strains, it is desirable that their corresponding varying mechanical values, which increase in such rapid progression with the increase of the subtending angle, *i. e.* proportional to its sine, should be readily conceived and at least approximately appreciated on mere inspection by the scaffold builder, who should be cognizant of the maximum insistent loads and the intensities of their normal distribution through the various members of the structure, when in a simple geometrical form. The methods of expressing geometrically and otherwise this analogy between angles and strains, etc., we shall have to defer the discussion of for the present. All this bracing involves the elementary principle that the triangle is the only form which is fixed and unchangeable under the action of distorting forces. Among the disadvantages of imposing transverse strain on a piece, are, that it employs, in the most prejudicial manner, too, only about a half of the sectional area in either tension or compression, the other half being simultaneously subjected to a contrary stress: *i. e.* the nominal half above the neutral plane, or half of the depth of a loaded rectangular beam supported at both ends is in compression, while the half below the neutral plane is in tension. The precise position of the neutral plane in a beam depends on the kind of materials, the relation which its compressive resistance bears to its tensile strength, and the degree of deflection. There is the further disadvantage attending transverse strain, that in the loaded beam or deflecting pillar, etc., all the fibres in each half-section are strained unequally, those fibres being most strained which are farthest removed from the neutral plane. In a bent beam or pillar, there is the least strain about the point or plane where the stresses change from tension to compression in consequence of the deformation. The strain on either the top or bottom assemblages of fibres may cripple or rupture them and render them useless, whilst at the neutral axis of the beam the strain will be reduced to zero, and all the intervening fibres in each half of the section between these extremes undergo varying intensities of strains, proportional to their perpendicular distance from such extremes.

As the typical triangular frame involves no transverse strains in its pieces, whether the joints or connections of the pieces together be what are termed pin or hinge joints, or are frame or stiff joints, or in the case of a frame of quadrilateral figure wherein a diagonal brace is fitted, merely butting against the resisting surfaces in contact with it, such butting surfaces should be perpendicular to each other and oblique to the axis of the piece or member which is coincident with the line of direction of the force. When the diagonal thus butts into an angle where two adjacent members of a frame are united, it is generally cut with a double bevel, so that the end will have both a vertical and horizontal butting surface in the ratio of the vertical and horizontal components of the oblique force passing through the diagonal. In such arrangement, the main joint of the quadrilateral framework receives unaided the thrusting strains which tend to separate the parts of the joint, and therefore it should be proportioned to perform this additional duty.

As we have had occasion to describe diagonal bracing in several of the scaffold structures already introduced we may here call attention in a more precise manner to a few of the principal properties which are involved in diagonal bracing.

Figure 5 was introduced to illustrate the capacity for distortion of a four-sided figure as compared with a three-sided one. The effect of a distorting external force in the direction of the arrow was indicated by the elongation of one diagonal and the shortening of the other; the normal diagonals being shown *dotted* in connection with the distorted rectangle which assumed a rhomboidal form. The proportional elongation of the one diagonal, and simultaneous contraction of the other, though indicated geometrically as having undergone distortion up to the position shown in the figure, the comparative significance may not be so apparent to some as if illustrated by arithmetical comparison. For which purpose if we suppose that the same force continue its distorting action on the figure until the two sets of two adjacent sides which contain the expanding angles that approach each other be drawn closer together until they are in superposition (a weight upon the upper side of the frame would produce such a distorting effect), so that all four sides shall be in two continuous straight lines, the one lying above the other, in this position it is evident that the contracted diagonal has been shortened the full length of itself, while, at the same time the elongated diagonal has only been lengthened by an amount equal to the excess of the length of the two sides over the length of the normal diagonal of the rectangular figure.

Assume each of the sides of the figure to be represented by unity, and as the constant ratio of the diagonal of a geometrical square to its side is 1.4142, which accordingly represents the amount of the contraction of the one diagonal, we are enabled to find the length of the diagonal of a square of any dimensions by simply multiplying the length of the side by the constant ratio 1.4142; though ordinarily 1.414 will be close enough for most purposes. Therefore, the one diagonal has been elongated by an amount equal to the following remainder:

$$
\begin{aligned}
\text{Two sides} &= 2. \\
\text{Less the diagonal} &= 1.4142 \\
\text{Elongation of diagonal} &= \overline{.5858}
\end{aligned}
$$

while the other diagonal has been shortened to zero from its normal length, which is equal to 1.4142

$$
\begin{aligned}
\text{Deduct elongation of other diagonal} \quad & .5858 \\
\text{Excess of contraction over extension} = \quad & \overline{.8284}
\end{aligned}
$$

It thus appears that the elongation is in round numbers about a third only of the contraction, therefore the diagonal brace under the action of the compressive force is more rapidly strained, in the absence of initial tension[1], than the other diagonal under the action of tensile strain. It is also evident that the internal force of initial tension which will assist the external distorting force diminishes rapidly under the action of initial strain. This anomaly indicates the necessity for intelligent discrimination in order to insure the judicious application of initial strain in the classes of counter-bracing where it is proper to introduce it, and hence, when distortion commences, this disparity of internal distorting forces, above demonstrated, is initiated, and continues increasing with the expansion of the one pair of opposite angles from 90° to 180°, while the sides move radially through a quarter of a circle, and the corresponding

[1] Initial tension may be briefly defined as the tightening of tie-rod counter-bracing, etc., in certain panels of trussed structural combinations, such as roof-trusses, and bridge-trusses, with the intention of anticipating the initial deformation of the truss.

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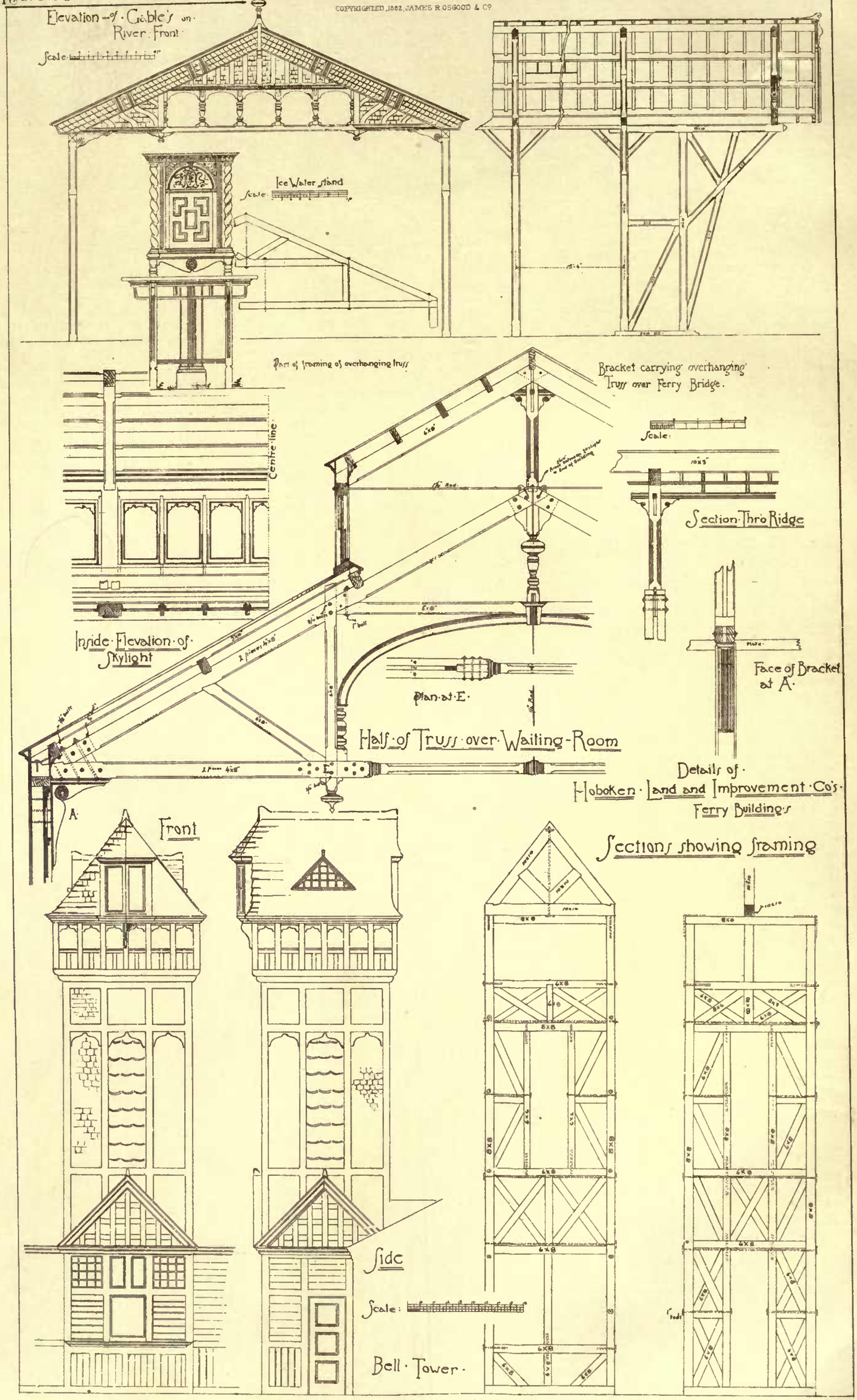

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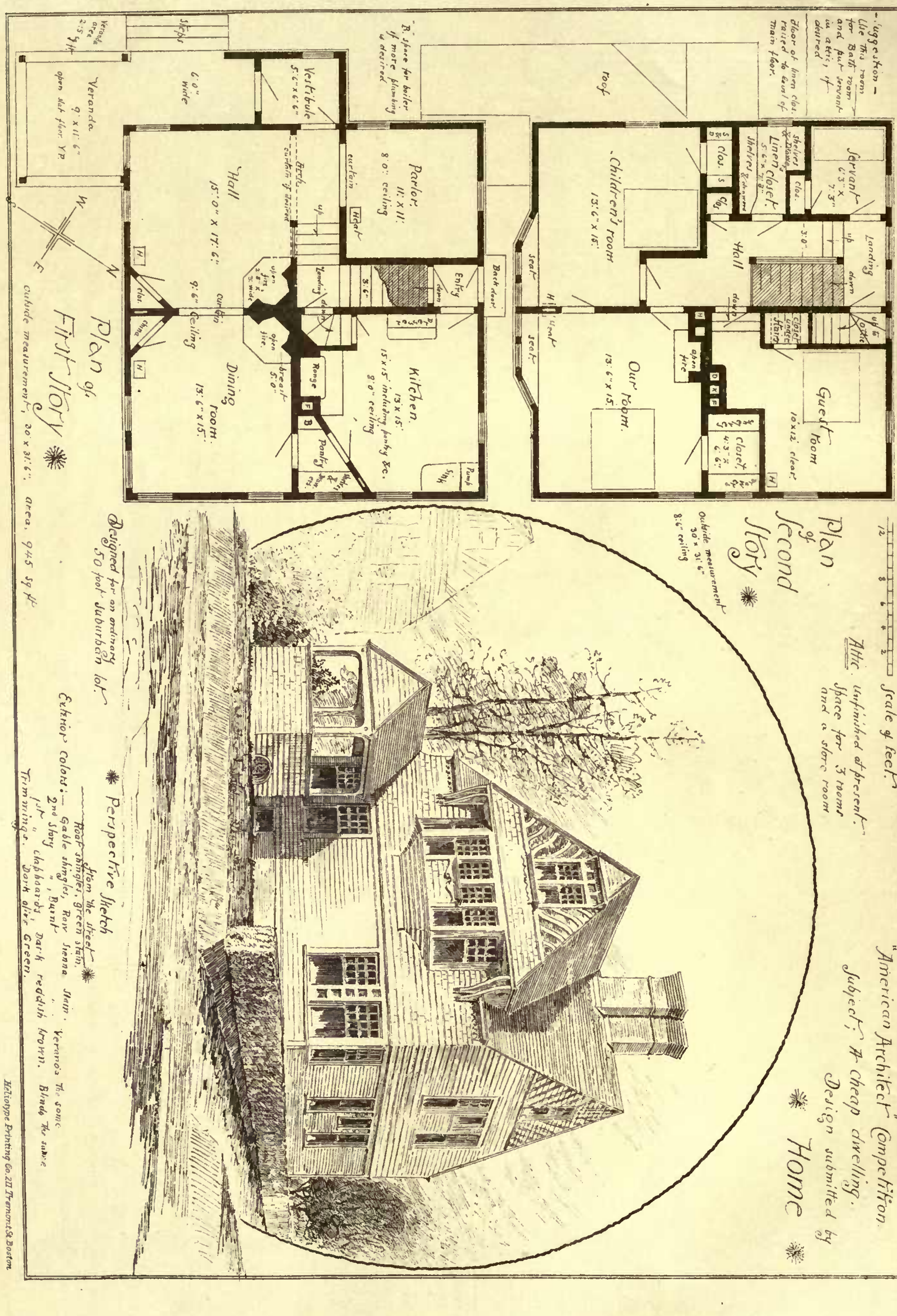

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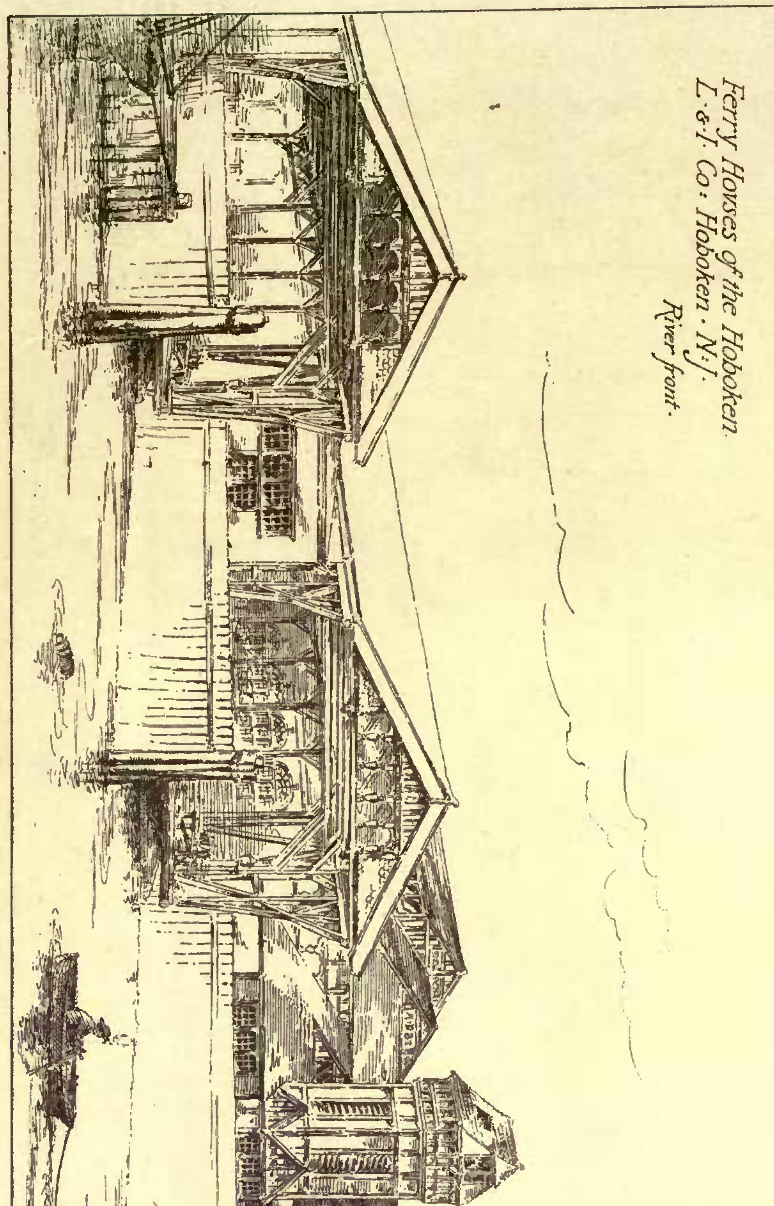
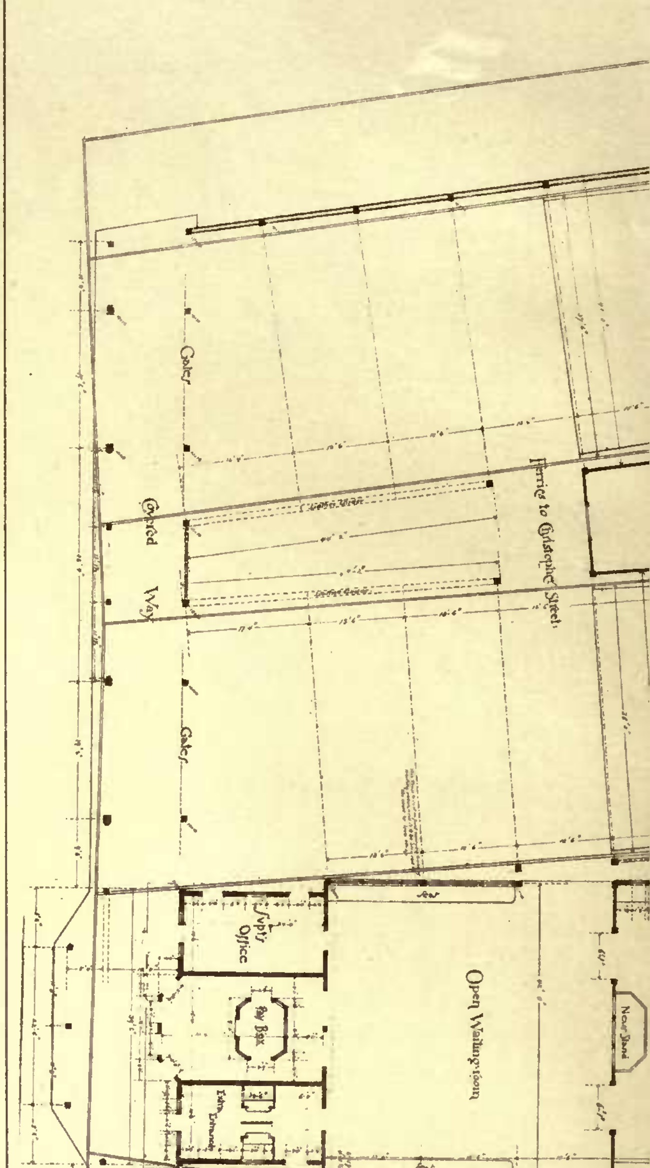


Ferry Houses of the Hoboken L. & I. Co: Hoboken · N.J. River front.



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Ferry Houses of the Hoboken L. & I. Co: Hoboken. N.J.
Shore front.
Plan of Ferry Buildings for Hoboken Land & Improvement Co.
Double lines show cutting of docks to relieve building from shock of landing of boats.
Dotted lines show centre of ferries
North River.
Floating Bridge
Engine Room
Floating Bridge
Ladies' Waiting Room
General · Waiting Room
Men's Waiting Room
Men's W.C.
Waiting Room Annex boat to Brooklyn.
Floating Bridge
Store Room.
Floating Bridge

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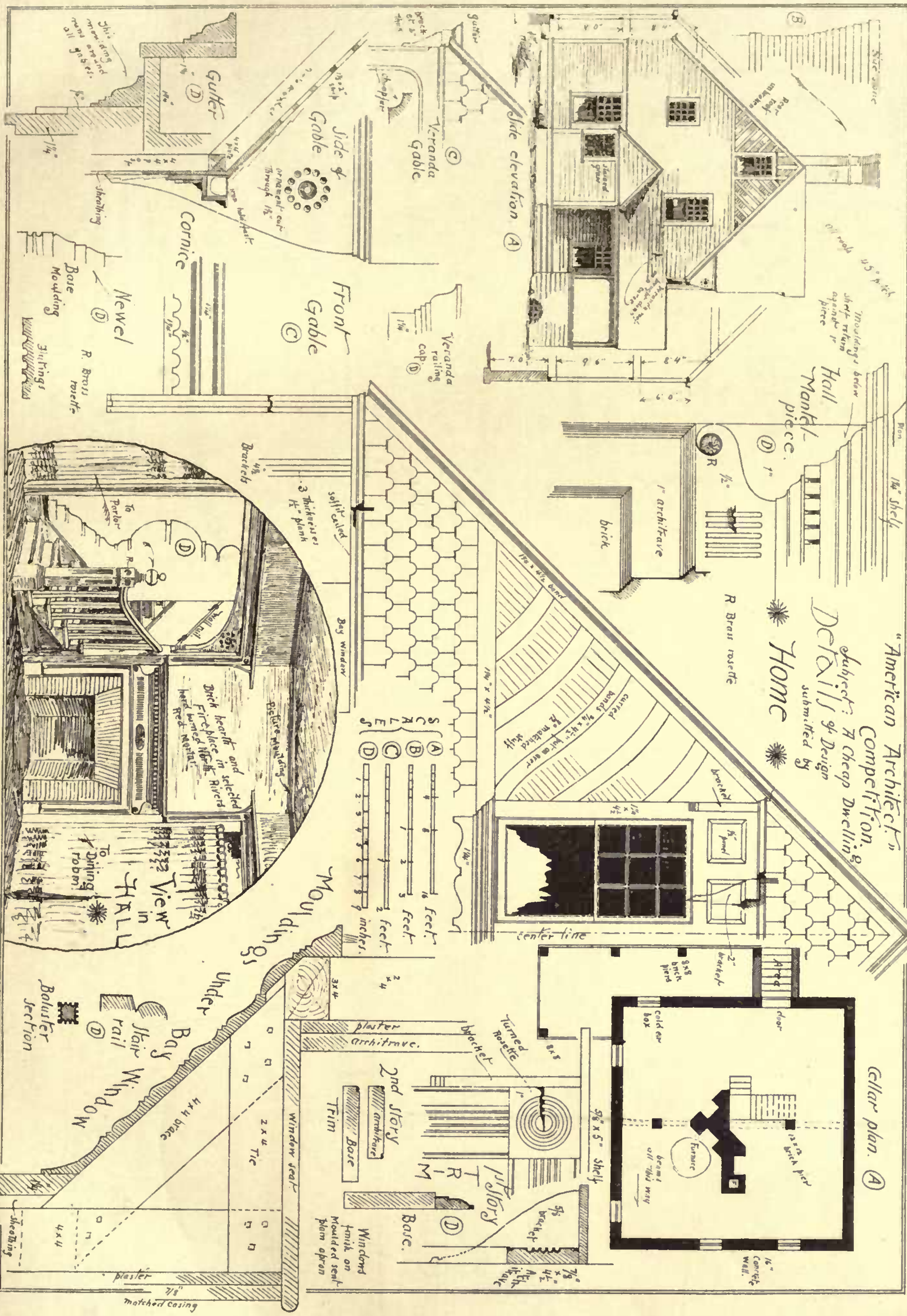

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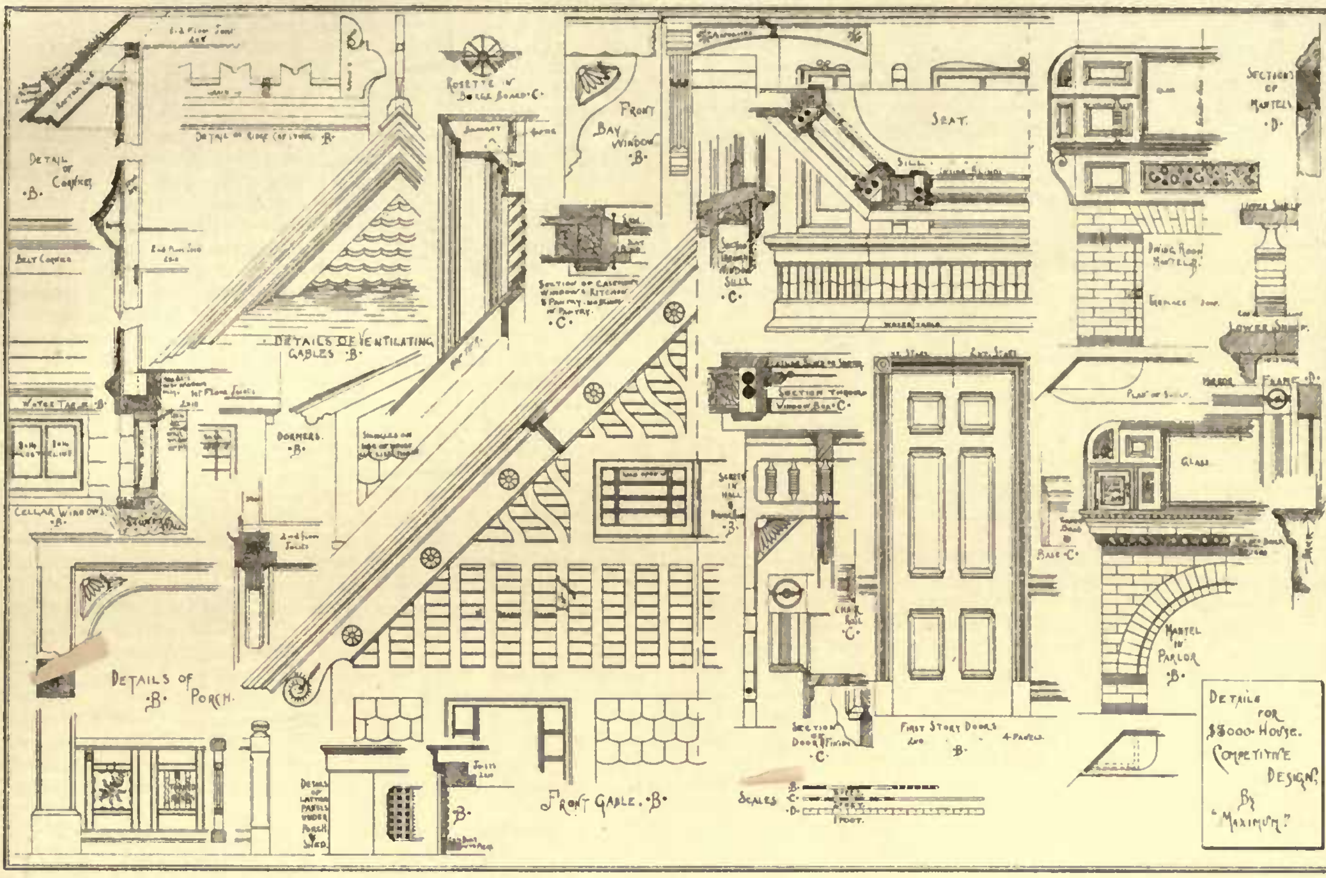

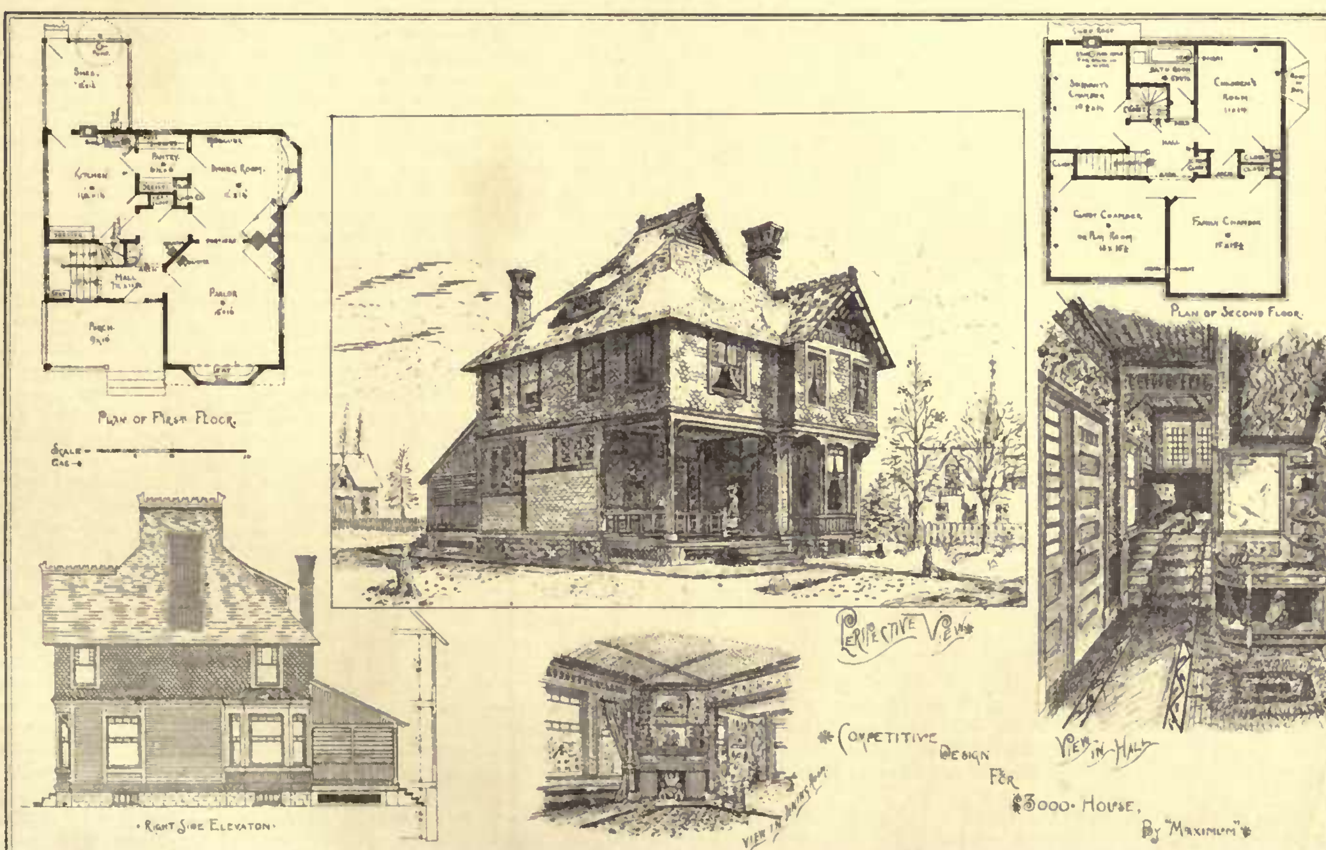

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contraction of the other pair of opposite angles, from 90° to 0°. Thus each of the pairs of opposite angles has passed through 90° or a quadrant. This will readily be seen by drawing a vertical line on the diagram from the upper vertices, where the sides of the quadrilateral figure meet the horizontal top line.

Bracing is also used in the sense of indicating the oblique piece which holds in position a vertical or inclined piece or part of a structure, by one end being fastened to it at any convenient point in its height, while the other end is fastened to a horizontal part of the structure, or other convenient object. In such a position it would form the third member in the triangular assemblage limited by its intersections with the other pieces or objects. It is therefore sufficiently evident that bracing, whether tie or strut, to be effective must be so carefully fitted and adjusted tightly as to instantly prevent, or as it were to anticipate the initial distorting movement, and hence the importance of tight-fitting, strong joints and other connections, which shall not yield at all when the maximum force is exerted against them; and under this idea what is called initial tension, as previously defined, is applied to counter-bracing of trusses, etc.; but its abuse has been a frequent source of danger to those structures by careless adjustment of tension diagonal bracings which impose excessive, uncertain and unequal strains upon the diagonals of a panel, which produces a greatly and often inordinately increased addition to the maximum calculated loads, and especially in giving a camber to trusses, — because there is no certain ready way of measuring the strains by any comparable unit of straining force, the stroke of a hammer, iron bar, etc., usually being the only means employed to indicate the state of tension; and even this test is often applied in an indifferent manner by careless workmen, having a very vague idea of the degree of intensity they impose and none whatever of the amount of stress which the sound may indicate in measurable unit force; and the same may be said of any other visible indication, as vibration, etc., or of the limit of elasticity of rods and bars, etc., or their connection swith the main parts of the structure. Any abnormal condition of strain in a structure means the constant presence of a restrained, though no less powerful, force always ready to act with unexpected energy on the instant when the restraint is in the least relaxed, and in fact it is force in a latent form, or *potential* energy as distinguished from *kinetic* energy.

1. The strain on any piece of a frame is proportional to the degree of intensity of the straining force. 2. The strain on any piece of a frame is in direct proportion to the sine of the angle which the direction of the straining force makes with the other piece, and in an inverse proportion to the sine of the angle which the pieces make with each other, because the lengths of the sides of a triangle are proportional to the sines of the opposite angles.

In many text-books there is a stereotyped caution (usually in very general terms, without recognition of any exceptions or indicating peculiar cases) against bolting or riveting together at their intersections the cross diagonal braces of a quadrilateral frame, as thereby a transverse strain is liable to be imposed on the diagonals; but as in a parallelogram, in which either the four sides or only the opposite sides are equal and parallel, (3) every diagonal divides it into two equal triangles, (4) the two diagonals drawn in any parallelogram *bisect* each other; therefore, in any frame in the form of a parallelogram there can be transverse strain on a diagonal only when there is an unequal stress of tension or compression on either diagonal on either side of (*i. e.* above or below) the point of intersection, or unequal play of joints that are not close fitting, or a yielding of splices (if any) in the individual pieces composing the frame, or unequal yielding of splices, when there are any equally distributed on each side of the intersection, or a disconnection of either joint of the diagonals where attached to the frame; otherwise the intersection remains a fixed intermediate point on both diagonals throughout any change of form of a parallelogram. But when the frame or panel of a structure is in the form of a trapezoid having its two sides taper towards the top, for instance, the intersection of the diagonals does *not* remain a fixed point in either diagonal when the frame undergoes any deformation, the portions of the diagonals above the intersection being shorter than those below: the relative lengths of these portions do not remain the same; the upper part of one diagonal is contracting while at the same time the other is extending at a different rate; and likewise in the portions of the diagonals below their intersection, the extension and contraction take place respectively in the same diagonal as in the upper portion, and also at a different rate to each other and to those of their upper portions; and hence in a frame panel of a trapezoidal form transverse strains must occur in the cross diagonals when bolted and riveted together at their intersection. As the geometrical figure in which the panels of scaffolding is usually constructed seldom assumes a true parallelogram, the caution would here seem necessary; but on the other hand any likely deformation within the elastic limit of the materials employed would not cause any crippling transverse strain. Therefore the source of danger is reduced to those of faulty workmanship in splices, joints, or other connections of pieces or members, or of the parts together of the individual members of the structure. Practically it may be presumed that any degree of deformation of a panel short of actual collapse of a structure, likely to be experienced, will not involve any amount of transverse strain on the diagonals which will be likely to produce deflection within the elastic limit of the timber employed, or such as would impair its compressive resistance, or snap the bolting or otherwise destroy the connection of the intersections, as the transverse elastic action in one diagonal would readily yield to any eccentric displacement of the intersecting point due to elastic tension or compression in the other diagonal.

In important permanent structures slovenly construction is not likely to enter, though there have been instances where imperfect bracing joints have been the cause of collapse, but in temporary structures such slovenly construction is liable to be the rule instead of the exception.

In structures which require to be carefully designed it is frequently important to observe that the bracing may be rendered not only ineffectual but vicious, by the introduction of what are called "redundant" members in the construction of frame assemblages, which may be thus explained. Frames should be constructed so as to prevent the elongation or contraction of one member producing the elongation or contraction of any other member. Thus if we draw the diagram of a frame in the form of a trapezoid, to consist of four members (with a diagonal), in which to enable us to distinguish the several members without the aid of an engraved diagram, let us number them thus: the top side let us number 1, the right side 2, the bottom 3, the left side 4, and the diagonal from top of 2 to bottom of 4, call 5. All the members are to be capable of resisting tensile and compressive strains. Such a frame cannot be distorted to any other form without causing alteration in the length of one or all of its members. If, however, one or all of the members, through a variation of temperature, if the structure be of metal, or from any other cause, shall change their length, such change will not produce a stress on any member, but will merely cause a variation in the *form* of the frame itself, and hence such a frame cannot be *self-strained*, *i. e.*, it cannot produce a stress on one member by some other member being of a wrong length, hence any error of this nature will merely change the *form* of the frame. But if an additional member be introduced, as the other diagonal, crossing from top of 4 to bottom 2, which call 6, then if 5 (diagonal) be shortened, 6 (diagonal) will be strained so as to elongate it, and the four principal members will be compressed; but if the diagonals are not made of exact length they and the four principal members will be permanently strained in either tension or compression, in unknown quantities which cannot be resolved into any known component stresses; such combinations usually ought to be avoided. A frame of this class, *i. e.*, of the double diagonal strut type is said to have one redundant member. But if both the diagonals, 5 and 6, were flexible rods incapable of resisting compression, there would be no redundant member, because the tightening of one diagonal would produce no sensible stress on the other diagonal. If the diagonal be a rod there would be two of them required to prevent a quadrilateral figure from changing its form. To technically distinguish such diagonal pieces of a frame as are only capable of bearing one kind of strain it is suggested by some writers that they be called "semi-members."

A frame such as above alluded to is technically defined as a rigid structure composed of straight struts and ties only, which are called members of the frame. The frame as a combined structure may be subject *as a whole* to a bending moment, but each member of it, whether a strut or tie, in the capacity of a column, pillar, rod, rail, or brace, composing the structure, is thereby only extended or compressed so that the total stress on a given member is the same at all its sectional areas throughout its length, while the intensity of stress is uniform for all the parts of any one sectional area. This uniform intensity must result in any frame, whose members are so connected together at the joints that they present no important resistance to change in the relative angular positions of the continuous members, as if, for instance, the members were pinned together by means of one circular pin, the axis of which coincides with the axis of the piece, and the direction of the only stress which can be transmitted from pin-joint to pin-joint, and from piece to piece passing through these pin-joints, will coincide with this axis, which becomes a line of resistance; and hence in discussing the stresses produced throughout the frame by an external force, it is treated for simplicity as consisting only of single straight lines between the joints, such joints being merely the meeting or intersection of these lines. The meeting or intersecting point of these lines at the intersecting point of the axes of the adjacent pieces of a frame or combination of frames, as in the angle of a quadrilateral panel of a truss, or braced skeleton structure, is called a "panel-point." This point is used for taking the dimensions of trusses "on centres," and for making the calculations of strains, and for representing these strains geometrically upon a skeleton diagram of the truss. These joints of frames are to be considered as possessing perfect capacity of rotary motion around the axis of the pin which, as in hinged structures, forms the axial connection of the pieces to admit of the angles formed by the connected pieces freely changing in the manner of a compass-joint.

While alluding to the theory of *redundant* structures it may be noted that redundancy generally leads to economy of construction, which is often a more expensive item than that of the materials. Though the first cost of longer and heavier scantlings may not be greater than that of short ones, it would not be economical to cut them into shorter lengths merely for the purpose of *hinging* them together again for the sake of avoiding redundancy in the structure. The

labor attending the exact location, on a large structure, of the precise geometrical position of connections, and of the laying off and construction of flexible joints, will exceed the expense of less precise connections, such as the lapping and bolting together of the ends of the pieces, which, though they will be free to move, will yet not be frictionless in the degree of properly finished articulated joints, but will not offer an amount of resistance against any angular movement of the pieces liable to take place in the frame, which would be likely to produce self-straining in the structure. Hence the fewer the articulated joints, which, to act properly, must be accurately fitted together, the less the cost of the structure. Redundancy is not justifiable when its presence is not intended to lessen the number of costly joints. In fact redundancy is rather prevalent because of the difficulty attending the making of good joints of timber. It would be absurd, for instance, to hinge together two pieces which butt against each other in a straight line, where both are in compression, when they were in such a position that there would be no compensating advantage in having them in two pieces in preference to having them in a single piece, unless the two pieces, if they were in one whole length would be of such an unwieldy size as to be inconvenient to handle, and expensive to manufacture. The thrust or compression can evidently be better transmitted through one continuous straight piece than if a joint were made in the middle of it, and the strain passed through a pin or other articulate joint in the same straight line. In the latter case the thrust cannot be transmitted past the pin or articulation without concentrating the pressure more or less on special sections and on the parts composing the joint, and thereby straining its materials unduly; and to avoid this would require a very clumsy connection as well as enlarged sections. The whole-length timber would be liable to cause a certain degree of self-straining in bending the whole-length piece like a beam. But whether this self-straining will cause more or less disadvantageous action of the excess of stress than is produced by the concentration of the thrust when being transmitted through the pin, it is in many cases impossible to know with certainty. There are certain cases in which it is found necessary or convenient to expose some of the members of a frame to bending strains, thus introducing redundancy; but many of such structures could probably be arranged to avoid the uncertainty as to the intensities of the stresses without having to sacrifice the mechanical advantages of having the two contiguous pieces united so that there should be no break in the continuity of transmitting the compression, or it may be tension. For instance, a trussed girder, with one or several vertical struts, is redundant when the naked girder is one whole stiff beam; but if the girder, instead of being in one stiff beam, were cut in two halves across the middle and bolted together by a lap-joint in the middle of the span, it would thus nominally relieve the frame of redundancy, but not secure inflexibility. The theoretical objection to beams or girders being trussed is not evaded. More than one truss-rod to the same beam is likewise objectionable, on the theory that if one rod be overstrained by inequality in length, the remaining rod will not be sufficient to afford the contemplated support without making each of them of extra strength, which would be overstepping the economy that in a large structure ought to be sedulously guarded, or else the number of rods being inconveniently increased would also interfere with economy.

A simple Fink roof-truss is redundant, being simply two trussed beams, inclined, rafter-like, to each other at an angle, and tied together at their apices; but by merely omitting the two tie-braces which radiate from its apex, it is rendered non-redundant, with however the disadvantage that the *struts* in the former case are thereby converted into *ties* in the latter form, and therefore they would afford no support to the middle point of the *principal*, but in consequence of their tension, draw it down, and endanger its being bent in the middle; whereas the first arrangement supported it. If the latter arrangement is adhered to so as to avoid redundancy, and it be required to reconvert the short tie back again into a strut so as to serve its original purpose, it would be necessary to lengthen it, so as to lower its foot below those of the principal rafter, which would make an awkward arrangement of truss for roofing.

Bracing-rods, when long and pliable, and hence liable to sag, may be stiffened considerably by connecting at their intersections, which will usually be a ring or strong casting to which they are screwed. Long bracings used in framed scaffolds are mutually stiffened laterally by being connected at their intersections, which will usually compensate for any advantage of disconnection.

All bracings should be perfectly straight in form, and in the grain of the timber. Braces acting as struts must be treated as columns of the length between their *fixed* points, and assigned their proportionate sectional area, in order to be capable of resisting deflection. Timber acting as a *tie* is stronger than as a strut; but the former depends on strength of joints and connections, in which the unreliable element of faulty workmanship enters. Large washers should be used at both ends of bolts employed in combining together the parts of timber structures. There is a common tendency amongst mechanics to regard bracing as mere guess-work, acquired intuitively in a vague sort of way, by practical experience, in which natural sagacity is deemed an all-sufficient and all-wise tutor, and therefore the necessity or possibility of estimating them exactly by mathematical formula is not thought of by mechanics not informed upon the subject. We shall have occasion to recur again to many of these topics farther on, in their proper order.

THE ILLUSTRATIONS.

FERRY-HOUSES, HOBOKEN, N. J. MR. H. EDWARDS FICKEN, ARCHITECT, NEW YORK, N. Y.

THIS building replaces the old houses which were liable to be flooded with every high tide, were ill ventilated, as all such buildings are apt to be, had no accommodation for smokers, and were generally inconvenient for the economical and rapid transaction of the immense business flowing through them, and is the result in its plan and construction of the most thorough investigation of all existing ferry-houses in the vicinity of New York and Brooklyn, and the experience of years of the officers of the company. This present building is now considered by them, after the trial of the past year, as a model for such structures, accommodating the large and impetuous flow of passengers directly from the Morris & Essex Railroad, through its gates from the depot adjoining, the still greater mass of people who night and morning go to and from both New York and Hoboken to home and business, and the accompanying freight and vehicular traffic; enabling the simplest management of the double service of it to Barclay and Christopher Streets, New York, without undue crowding, or detention of people in crowds; with ample waiting-rooms, smoking-rooms, and other necessary conveniences. The building is 225 feet long, with a covered way across its entire front, enlarged in the centre to a bay, giving shelter to those who may be obliged to wait a few minutes after passing outside or waiting to enter: this is inclosed with storm-doors in winter. White and yellow pine were used entirely in the construction, with redwood shingles on the outside wherever shingles were used. Roofs over main building were covered with gravel roofing. On the river-front the gables over the slips project about fifteen feet over the boats, affording complete shelter in passage to and from them. The tower serves as a bell-tower and has a powerful lantern, and acts also as a ventilator to the water-closets of both waiting-rooms, and, combined with proper and perfect plumbing, keeps them perfectly pure at all seasons. The long skylights over waiting and smoking rooms are worked by a patent apparatus from below. The interior finish of these rooms is in soft wood painted, and hard woods in their natural colors, and is designed after the manner of old country-house halls. In the centre of the general waiting-room is the large water-cooler for ice-water, made of cherry, of which a sketch is given. A novel feature of the plan is the angles at which the slips have been built, which were based upon the action at this point of the North-River tides with regard to the ferry uptown to Christopher Street, and the one down-town to Barclay Street.

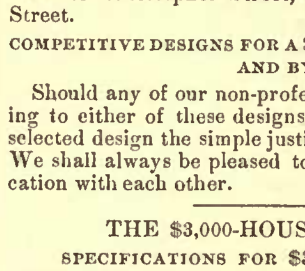
COMPETITIVE DESIGNS FOR A $3,000-HOUSE SUBMITTED BY "*Home*" AND BY "*Maximum*."

Should any of our non-professional readers desire to build according to either of these designs, we trust he wil do the author of the selected design the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

THE $3,000-HOUSE COMPETITION — III.

SPECIFICATIONS FOR $3000-HOUSE. BY "MAXIMUM."

[These specifications are not considered sufficient to base a contract upon, but merely to indicate the amount of work and class of materials upon which the estimate has been calculated.]



EXCAVATION: — Top soil removed, cellar excavated to a depth of 3′ 10″ below curbstone level, dirt taken from cellar, graded up around house and top soil replaced. Grade line around house to be 12″ higher than top of curb. Excavate for cistern and piers under shed, outside cellar-way and pier under porch. No cellar under porch or shed.

Stone-work: — Cellar walls and piers built of good quarry-stone laid on flat bed in good lime-and-sand mortar. Cellar walls 18″ thick and tuck-pointed above ground with red cement. Pier under porch 2′ 0″ square with footing-course 3′ 0″ square; all other piers 18″ square. Retaining-wall to outside cellar-way 18″ thick. Flagstone sills to cellar windows 3″ thick. Stone piers in cellar to support girders under joists. Outside cellar-way to be under pantry window.

Brickwork: — Build ash-pits in cellar under fireplaces and start central flue for furnace. Build fireplaces of pressed-brick with moulded corners, etc., as shown, laid in brown mortar and well cleaned and oiled when finished. Soapstone hearths in niches with hole cut and iron lid. Pressed-brick hearths in front, laid in approved design in cement. Stove-pipe holes with thimbles in all rooms through which chimneys pass. Chimneys carried up to roof with common brick, above roof to be stretcher bricks laid in brown mortar and stopped-out with cement. Flagstone caps 2″ thick, holes cut through for flues.

Carpenter-work: — Top of first floor to be 3 feet above grade line. First-floor joists, 2" x 10" bridged; second-floor joists, 2 x 10" bridged; third-floor joists, 2" x 8"; girders in cellar, 6" x 8"; wall-plate, 2" x 6," double; outside studding, 3" x 4"; inside studding, 2" x 4"; upper plate, 2" x 4", double; rafter, 2" x 6"; collar braces, 2" x 6"; shed rafters, 2" x 4"; shed corner-posts, 4" x 4", cased; shed intermediate posts, 2" x 4", cased; shed joists, 2" x 10"; shed sill, 6" x 8".

Frame: — The above timber to be all hemlock. Frame of house boarded over with 1" rough hemlock or pine boards; first story covered with 5" bevelled siding, 1" lap; second story with cypress shingles, cut ends, 6" to weather. Front gable covered with ⅞" beaded boards, tongued and grooved, 3" wide, with 1⅜" pilasters over, walls under.

Porch: — Porch the same; porch ceiling beaded boards 3" wide: floor of white pine boards, 3" wide, joints white leaded.

Roof: — Roof of house open-boarded, and covered with 20" cypress shingles laid 5" to weather.

Floors: — Floors throughout house ⅞" yellow-pine, first floor select; third-floor to be 24 feet square laid from refuse of other two.

Windows: — All windows first and second story to have 1½" sashes; Kitchen, Pantry, and small windows in Hall to have casement-sashes, to open out. Kitchen windows to have inside blinds made same as outside blinds; 1¼" casement-sash in third story to open in. All other windows in first and second stories to be double sliding-sash, hung with weights. Single windows in Hall and Parlor to have outside blinds or shutters, as preferred. Bay-windows in Parlor and Dining-room to have inside blinds, cut horizontally once. All windows in second story to have outside slat-blinds. Cellar windows to have hard-wood sills, 1½"sash, hung at top to open in, with wire screens outside.

Doors: — All closet doors 1¼" thick with plain, beaded, flush panel on inside face, outside to correspond with other doors: all other doors 1½" thick, raised panels, chamfered stiles, moulded rails; first story, 6 panels; second story, 4 panels; finish as per detail. Chair-rail in Hall, Dining-room and Kitchen.

Finish: — Hall, Parlor and Dining-room finished in cypress; Kitchen, Pantry and Bath-room, yellow-pine; all other rooms in second story, white-pine; third story not finished at all. Bath-room wainscoted 4 feet high. Front door to have 5 horizontal panels, glass at top, and side-light.

Dresser in Pantry with upper and lower doors and drawers. Slide between dresser and China-closet in Dining-room. Kitchen dresser to have upper and lower doors, row of drawers at one end, and place for flour-barrel in centre, with door and lid.

Shed: — Shed wainscoted 3 feet high, upper part of slats 6" wide pivoted on hard-wood dowels. Gables of planed boards 6" wide battened. Rafter ends sawed same as dormers: two outside rafters planed. Roof rough boards and shingled. Cistern, 6' x 6', round, 1½" pine staves.

Painting: — Outside of house to have three coats of lead and oil in three approved colors. Roof to have two coats of light red paint. Parlor, Dining-room and Hall to be finished with two coats of white shellac rubbed smooth, mantels the same. Kitchen, Pantry and Bath-room to have two coats of hard oil-finish rubbed down; Chambers and Hall, second story, to have three coats of paint in two approved colors. Floors throughout first story, oiled one coat.

Glazing: — Glass in Parlor, Dining-room, Hall, and two front Chambers, lower sash double-thick select French (not plate); upper sash, double-thick select American. Plain French-plate mirrors in Mantels. Glass in Kitchen Pantry and third-story windows single-thick American. Glass in windows on Hall landing, Cathedral tinted, worth 30 cents per square foot; border around side-light the same; centre of side-light frosted. Crackle glass in top of front door. tinted; all other windows throughout ordinary double-thick American.

Plastering: — Walls and ceilings throughout first and second stories to have two coats of brown and one coat of hard white finish. Plaster arches with quarter-round corners where shown by dotted line on plan.

Plumbing: — 14-oz. copper bath-tub, and first-class pan or Watson's closet, in Bath-room; 4" cast-iron soil-pipe run through roof. Cast-iron sink in Kitchen with hot and cold water faucets connected with galvanized-iron circulating boiler. Slop-sink in shed with bell-trap, and hot and cold water cocks over. Cast-iron lift-pump in cistern, 6" terra-cotta vitrified drain-pipe from street to soil-pipe, 4" extension to slop-sink and cistern overflow. Self-acting hopper-closet in cellar for servants, and drainage-trap for cellar. The service-pipe from street and throughout house to be ⅝" lead.

Gas-fitting: — Gas-pipes run from cellar to points on plans designated by a *.

Heating: — 36-inch galvanized-iron portable furnace placed directly under Parlor and Hall registers. One pipe to two front Chambers, one pipe to Bath-room and Children's room, and one pipe to Dining-room. Servant's Chamber to be heated in winter by stove-pipe from range passing through drum (not included in contract). Black japanned registers throughout.

Tin-work: — Best charcoal tin (IX) stock. Valley gutters 14" wide. All water carried to rear and down to cistern through one 5" conductor. Tin flashing to chimneys and dormers 5½" x 4".

Hardware: — Three-tumbler R. & E. lock to front door with real bronze front and striker, night-latch attachment with two nickel-plated keys, and fast-and-loose knob-attachment. Real bronze knobs and escutcheon plate, plate and rose in one piece. Kitchen closet to have mortice-latch, all other doors throughout house to have 4" M. W. & Co. mortice-locks, brass fronts and strikers, and nickel-plated keys. Doors opening from Hall, Parlor and Dining-room to have real bronze knobs and escutcheons; all other doors, hemacite knobs with bronze roses and escutcheons. All doors, first story, hung with 3½" x 3½" copper-bronzed, polished butts, steeple tips. Second-story doors hung with japanned-iron butts, plated tips.

All double-hung windows to have Morris's sash-locks, Berlin bronze, and lifts the same; windows hung with Silver Lake white cotton braided sash-cord. All the outside blinds and shutters hung with Lull & Porter's shutter-hinges and fastenings. The inside blinds to bay-windows, Kitchen blinds and dresser-doors, all hung with 2" polished copper-bronzed butts. Berlin-bronze spring cupboard-catches on dresser-doors and kitchen blinds. Berlin-bronze drawer-pulls to dressers; 1½" copper-bronzed polished back-flaps, and real bronze shutter-bars and knobs on inside shutters to bay-windows. Barrel-bolts on shed and cellar doors, the latter hung with heavy T-hinges. Real bronze bell-pull and plate to front door connected with swinging bell in kitchen:

Final: — All of the above-mentioned materials are considered to be the best of their respective kinds, and of as high a grade as the amount to be expended will allow, and are to be placed in position in the most thorough and workmanlike manner.

ESTIMATE OF QUANTITIES AND PRICES RULING AT PHILADELPHIA, PA.

Item	Amount
Excavation and grading, 133 cub. yds., @ 40c	$53.20
STONE-WORK.	
64 perches of stone laid, @ $4.00	256.00
5 cellar window-sills, @ $1.00 each	5.00
TIMBERS AND BOARDS.	
Girders in cellar, 6 x 8 = 340 sq. ft.	
1st and 2nd floor joists, 2 x 10 = 2,450 sq. ft.	
3d-floor joists, 2 x 8 = 1,100 sq. ft.	
Outside studding, 3 x 4 = 2,600 sq. ft.	
Inside studding, 2 x 4 = 1,000 sq. ft.	
Rafters, collar-beams, etc., 2 x 6 = 1,400 sq. ft.	
Rough 1" lumber 5,000 sq. ft.	
(@ $14.00 per M.) 13,890 sq. ft.	194.46
3,500 sq. ft. flooring measure of flooring @ $30.00 per M.	105.00
1,000 sq. ft. 5" siding @ $30.00 per M	30.00
8,000 20" cypress shingles @ $9.00	72.00
500 " " " cut ends @ $12.00	60.00
Plastering, 850 sq. yds. @ 25c per yard	212.50
Tin-work	25.00
Heating. Estimate from reliable dealer	90.00
	$1,103.16
BRICKWORK.	
2,400 stretchers, @ $10.00 per M.	$24.00
1,100 common, @ $8.00 per M	8.80
400 pressed brick, @ $25.00	10.00
75 moulded brick, @ $50.00	3.75
2 flagstone chimney-caps	4.00
2 soapstone niches	3.00
4 bbls. lime, @ $1.25	5.00
4 loads of sand	4.00
½ bbl. cement	.70
270 lbs. coloring matter, @ 3c.	7.10
Bricklayer, 7 days @ $3.50	24.50
Laborer, 7 days @ $2.00	14.00
Cartage	2.00
Profit	10.00
Total for brickwork	$120.85
Plumbing and gas-fitting	$240.00
Painting and glazing	$250.00
MILL-WORK.	
5 cellar window frames and sash @ $3.00	$ 15.00
13 double-hung windows, with outside blinds, or shutters, and inside finish complete, average $8.00 each	104.00
2 bay-windows, with inside blinds, inside finish, etc., all complete	50.00
Front door, frame and side-light complete	15.00
7 casement windows complete @ $3.00	21.00
Sash, frames and moulding, etc., for dormers	12.00
1 gable window	3.00
170 lin. ft. (main cornice, barge-boards, etc., @ 10c	17.00
120 lin. ft. belt cornice, @ 6c	7.20
750 sq. ft. beaded boards for gable, porch ceiling and walls, @ 3c	22.50
1,000 sq. ft. dressed pine boards, for shelving, miscellaneous, etc.	25.00
Porch railing, arches, etc.	15.00
Hall and dining-room screens	15.00
13 double-face doors, average $3.00	39.00
10 single-face doors, average $2.	20.00
23 door-frames, @ 75c	17.25
681 lin. ft. inside finish, @ 3c.	20.52
2 cypress mantels, each $30.00.	60.00
150 lin. ft. of chair-rail, @ 3c	4.50
1,100 lin. ft. 0" moulded base, @ 7c	35.00
Kitchen dresser	15.00
Pantry "	10.00
Lattice panels under porch and shed	12.00
Cresting	5.00
500 sq. ft. yel. pine 2" plank, cellar outside and inside steps, etc.	10.00
Sum total for mill-work	$569.97
HARDWARE.	
1 front-door lock	$ 4.50
1 bronze plate and knobs for front door	3.00
1 bronze bell-pull and plate, 3½" x 6"	1.35
22 mortice-locks, 4", @ $8.88 per doz.	16.28
1 mortice-latch for kitchen closet	.60
13 pr. 3½ x 3½ polished copper-bronzed butts, @ $3.35 per doz.	8.45
12 pr. 3½ x 3½ japanned-iron butts	3.35
5 pr. bronze knobs and escutcheons, @ $1.40	7.00
18 pr. hemacite knobs, bronze roses and escutch'ns, @ 80c.	14.40
Swinging bell and wire, mounted	1.00
580 lbs. of window-weights, @ 1⅓c	8.00
6 hanks of sash-cord, @ $1.10	6.60
3 doz. pr. copper bd. 2" butts, @ 75c per doz.	2.25
19 Berlin bronzed sash-locks, @ $3.00 per doz.	4.75
19 Berlin bronzed sash-lifts, @ 30c per doz.	.48
1 doz. pr. back-flaps, copper bd.	.70
1 doz. real bronze shutter-bars,	2.65
3 " " " knobs, @ $1,	3.00
14 pr. 3" cast-iron butts, for C. windows	.70
Hooks and staples	.50
13 sets of Lull & Porter's shutter-hinges	2.30
1 doz. Berlin bd. drawer-pulls,	.60
18 cupboard catches	1.50
6 doz. japanned wardrobe hooks, @ 15c	75
12" T-hinges for cellar-door	.38
2 barrel bolts	.36
2 gross screws	.66
100 lbs. 10 *d* nails	3.75
200 " 8 *d* "	8.00
200 " 4 *d* "	8.50
50 " 20 *d* "	1.87
5 " 8 *d* finishing nails	2.50
Total for hardware	$121.63
Extras	20.00
Architect's fee	75.00
Carpenter-work and profit to contractor	500.00
Total estimate	$3,000.61

SUMMARY.

Item	Amount
Hardware	$121.63
Stone-mason's contract	314.20
Lumber, shingles, etc.	461.46
Plastering	212.50
Tin-work	25.00
Heating	90.00
Brickwork	120.85
Plumbing and gas-fitting	240.00
Painting and glazing	250.00
Mill-work	569.97
Architect's fee	75.00
Carpenter-work and profit	500.00
Extras and contingencies	20.00
Total	$3,000.61

Of the above estimates, the stone-mason's, bricklayer's, plasterer's, painter's, plumber's, heating, carpenter-work, and tin-work were all furnished by reliable men in the different lines of trade. The prices of hardware were given by J. B. Shannon & Sons, 1009 Market St., Philadelphia, from goods selected from their shelves. All of the respective contractors guaranteed a first-class job in their respective lines. The estimates are intended to erect the building in the vicinity of Philadelphia, but in the western part of Pennsylvania or New York they would be about thirty per cent lower.

DESIGN SUBMITTED BY "*Home.*"

EXPLANATORY SPECIFICATIONS.

Mason-Work : — 16″ concrete cellar wall, built between plank, and against the earth. Small stones, rammed down in cement-mortar. When finished has a coat of cement inside and outside (above ground). Jambs and corners in brick.

12″ Brick piers, and chimney foundations in brick.

Best hard-burned brick throughout.

Bluestone sills and chimney-cap. Bluestone lintel in kitchen.

Cellar bottom, concrete and cement.

Chimney topped out in selected hard-burned brick.

Open fireplaces and hearths laid in hard-burned brick.

All brickwork showing to be laid in red mortar, with sunken joint.

8″ brick around all flues, withs 4″. Cellar area, 8″ brick wall coped with bluestone.

Flagging steps, brick risers.

Cistern : — 10′ diameter. 10′ 6″ deep to spring of dome. 4″ brick wall backed up with concrete. 8″ dome. Concrete bottom, laid in and smoothly coated over with Rosendale cement. Flag over man-hole. 4″ brick filter wall. Build in 4″ tile-drains from foot of all leaders. 6″ overflow to small, dry stone cesspool.

Drain : — 5″ glazed pipe; 100 feet to cesspool; moveable cover to running-trap ; 5″ vent between trap and house.

Cesspool : —8 feet diameter, 8 feet deep to spring of dome, same as cistern, coated with cement. Two vent-pipes to grade, one longer than other; overflow to a charcoal pit.

Plastering : — Two coats on hemlock or spruce lath; finishing-coat rough sand-finish, white sand and Morris Plains, N. J., sand, mixed. No cornices or beads, arches or brackets; brick mud filling between first-story beams.

CARPENTER-WORK.

Timber and Lumber : — Hemlock frame and sheathing; exposed timber and lumber, second-quality pine, except clapboards, which are to be clear pine. Interior work in clear white-pine. Finish in pine throughout, except stairs, which are to be yellow-pine. Floors, second-quality pine.

Attic : — Attic unfinished, except that it has a floor. As the family increases, the attic can be made available.

Framing : —Balloon method. Timbers all 16″ centres. For sizes see bill of quantities. Double cross-bridge every five feet. Long braces cut in, partitions trussed, openings trussed, bearing partitions footed on partition-head.

Roofs have 1 1-8″ x 2″ strips nailed to rafters, 5″ centres on which to lay shingles ; rest of frame sheathed with 1″ x 8″ hemlock put on diagonally ; sheathing paper over sheathing. Beaver, No. 2; clapboards 6″ wide, 1 1-4″ lap.

Corner boards, casings, bands, etc., 1 1-4″ x 4 1-2″, rebated where necessary to receive shingles and clapboards.

Shingles : — On second-story walls, veranda, and roofs, sawed pine, irregular widths laid in usual manner in regular courses. Gable shingles sawed pine, regular widths; water-table 1 1-4 x 8″; belt course, 1 1-4″ x 4 1-2″

Veranda : — 1′ x 3″ yellow-pine floor, laid 1-8″apart, boxed posts and plate ; close railing, shingled outside, ceiled inside, railing cap ; ceiling ceiled straight across.

Gables : — Single moulding and band. See detail.

Cornice : — Mouldings under projecting bay, etc. See detail.

Blinds : — Hall, Dining-room and windows in bay, to be Venetian slat-blinds. Other windows of first and second stories, 1 1-4″ rolling-slat outside blinds.

Floors : — First story has double floor with paper between. Under floor rough hemlock. Other floors 1″ x 6″ matched pine. Hard-wood saddles for doors.

Doors, regular sizes, factory-made. Furniture of the most inexpensive kind — see quantities.

Windows : — Small lights in upper sash ; lower sash, single light. Double-hung in usual manner. Small windows casement-hung.

Glass : —Double-thick French sheet for lower sash; upper sash in American glass.

Trim of the simplest description. See detail.

Mantel-pieces : — Pine. Three of them to cost not over $75.

Stairs :— Cellar, plain and strong; open risers; no rail. Main flight, yellow-pine newels, rail and balusters. See detail. Boxed from landing up, with hand-rail secured to wall. Box stairs to attic; no rail.

Fittings : — Dresser with glass doors in Kitchen. Closets provided with shelves and drawers. Picture-moulding in Dining-room, Hall and Parlor.

Plumbing : — Plan is arranged so that Servant's room in second story can be made a Bath-room if it is desired to have more plumbing.

Range : — " Fawn " No. 2., Simond's Manufacturing Company.

Sink :—20″ x 30″ *cast-iron sink.* 2″ waste to drain. Waste-pipe carried up from top of trap out of roof.

Ordinary suction-pump in Kitchen, connected with cistern.

Tinning : — Gutters lined and usual tin flashings; galvanized-iron leaders.

Painter : — Fireplaces and hearths, two coats of oil. Chimney exterior, two coats oil. All exterior wood-work to have a coat of crude petroleum oil. Shingles to be dipped in the oil. Oil stained colors desired. Shingles to have another coat of oil (linseed) with stain, making two coats of lead and oil paint. For colors see under perspective.

Veranda ceiling and floor, two coats of oil. Inside work, Second-story and Kitchen, two coats of paint. Rest of house two coats, Dexter Bros., 57 Broad street, Boston, mahogany stain, rubbed to a smooth polished surface.

Furnace : — Portable, moist air. (John Hyslop, 206 E. 29th street., New York, N. Y.)

Estimates of Quantities and Prices ruling at South Orange, N. J.

[Prices of Labor: Carpenter, $2.50 and $2.75; mason, $2.50 and $3.00; laborers, $1.75 and $2.00. This is the winter schedule, the outside prices of which are taken in this estimate.

Contractor : — A. F. Behring, contractor, 327 Fourteenth Ave., Newark, N. J., has verified these quantities and prices. He is now building a house similar in plan, but more elaborate and broken up in exterior, for $3,375. This, however, includes plumbing to the amount of $347.

Waste : — The allowance for waste, etc., is reckoned-in in each item, varying from 5 to 10 per cent.

[Especial attention is called to the simplicity of construction: A square house — central partitions carried up; gable roof, broken only by a gable in front; no break in the rear.

The front part of the house (first story) has a 9′ 6″ ceiling; rear part, 8′. Second story, 8′ 4″ throughout. In second story, 6′ from floor to roof-line, where rooms are cut off by roof.]

MASON.

Item	Amount
264 cub. yds. excavation @ 35c..	$82.40
Extra for grading around house,	25.00
52½ perch concrete cellar wall, including cement and labor, laid, @ $5.00	262.50
14 perch grouting and cement bottom for cellar, @ $4	56.00
15 MM. hard-burned Jersey brick @ $9.50, delivered	142.50
Laying the same, 15 MM., @ $8, including cement, etc.	120.00
712 sq. yds. plastering, @ 30c. (This includes labor and cost of materials, lime, lath 3,500, etc.)	213.60
270 ft. drain-pipe, @ 20c.	$54.00
Trap for same, $1.25; vent-pipes, etc., $1.50	2.75
Range lintel	2.00
Chimney-cap	4.50
15 feet bluestone sill, @ 25c	3.75
54 feet bluestone steps, @ 25c...	13.50
Patching, plastering, etc.	10.00
Labor, etc., not included in above	20.00
Total mason-work	$1,012.50

HEMLOCK TIMBER AND LUMBER.

No.	*Size in inches.*	*Lengths in feet.*		
1	6 x 8	18	girders in cellar	72
3	6 x 8	10	and	120
1	6 x 8	16	for veranda	64
40	2 x 10	16	first and second story joist	1067
11	2 x 10	24	veranda	440
8	4 x 10	16	trimmers and headers	427
16	2 x 8	16	attic joist	341
4	4 x 8	16	" trimmers and headers	171
6	4 x 6	18	main posts and braces	2'6
8	4 x 6	16	sill	256
5	4 x 4	24	plates	80
2	4 x 4	16	and braces, etc.	43
34	3 x 4	20	window and door studs	680
3	3 x 4	14	" " "	42
8	3 x 4	16	" " "	128
10	3 x 4	18	partition-heads and braces	180
48	2 x 4	22	studs	704
25	2 x 4	24	"	400
28	2 x 4	20	"	280
12	2 x 4	18	"	144
8	1¼ x 4	16	girts	53
16	2 x 6	12	ceiling-joist, veranda	192
24	2 x 6	24	rafters	576
10	2 x 6	20	"	200
34	2 x 6	16	"	544
2	3 x 8	20	valley-rafters	80
1	3 x 8	10	" " veranda	20
240	1⅛ x 2	16	strips for shingles	720
5000 ft. rough flooring and sheathing				5,000
				13,140

Total, say 13½ MM. hemlock, @ $18.00 .... 243.00

Item	Amount
Paper, 5,000 sq. ft. (uninflammable) @ ½c	25.00
Shingles, 17½ MM. sawed pine, @ $4.50	79.25
Clapboards, 1,500 sq. ft., @ 3c...	45.00
SECOND-QUALITY PINE.	
500 ft. matched ceiling ½″, @ 3c	15.00
2,200 ft. matched flooring (first and second story,) @ 4½c.	99.00
1,000 ft. matched flooring (attic) @ 3c	30.00
1,000 ft. bands, W. T. belts, etc., @ 4c	40.00
750 ft. exterior door and window frames, @ 4c	30.00
200 ft. cellar area, cold-air box, etc., @ 4c	8.00
Mouldings, Trimmings, etc.	
350 ft., 2 x 3¼, @ $4.70	16.45
50 ft., 1¼ x 2, @ $1.35	.68
75 ft., 1 x 4, @ $2.15	1.58
25 ft., 1 x 3¼, @ $1.75	.44
10 ft., 5 x 1½, @ $4.00	.40
250 ft. (first-story door-trimming), ⅞ x 4½, @ $2.40	5.00
26 corner-blocks (doors), 4½ x 4½ x 1″, @ $4.00	1.04
20 corner-blocks (windows), 4½ x 4½ x 1″ @ $4.00	.80
150 ft. (windows), ⅞ x 4½, @ $2.40	3.60
100 ft., 1 x 1, @ $.85	.85
100 ft., 1 x 1, @ $.85	.85
150 ft., ¾ x 2½, @ $1.35	2.03
175 ft., 1¼ x 3 (picture moulding), @ $1.75	3.07
CLEAR PINE.	
300 ft. door-jambs.	
250 ft. room-base.	
400 ft. second-story trimmings.	
500 ft. fittings, etc.	
350 ft. stairs.	
Total, 1,800 ft., @ 5c	90.00
Miscellaneous sundries, 500 ft. pine, @ 5c	25.00
3 mantel-pieces complete, set up (estimate)	75.00
Stairs. Newel rail and railing, yellow-pine	20.00
Veranda flooring, 1 x 3, 200 ft., @ 4c	8.00
63 ft. rolling-slat blinds, @ 27c.	17.01
150 sq. ft. Venetian cherry slat (London back), @ 30c	45.00
3 moulded doors, 3 x 7 x 1¾, @ $3.09	9.27
3 moulded doors, 2′ 10″ x 6′ 10″ x 1½, @ $2.92	8.76
17 moulded doors, 2′ 8″ x 6′ 8″ x 1½, @ $2.75	47.50
Total	$2,006.98

HARDWARE.

Item	Amount
1 Front door mortice-lock and night-latch. Polished brass knobs, etc., two keys	$4.75
5 Mortice-locks (4½″) with light bronzed knobs, etc. Keys, @ $1.00	5.00
17 Mortice-locks (4½″), brown mineral knobs, etc., @ .50	
1 Padlock @ .20, and 4 strap-iron hinges @ 7c. Cellar area doors	.48
6 5″ loose-joint japanned butts @ 35c	2.10
16 pr. 3″ x 3″ ordinary butts @ 8c	1.28
4 Flush-bolts for two outside doors	1.34
36 Drawer-pulls, imitation bronze @ 2c	.72
18 Sash-fasteners, imitation bronze, @ $1.00 per doz...	1.50
13 Fastenings for casement-windows @ .20	2.60
13 pr. hinges for casement-windows @ 4c	.52
1 Lock and bolt for dresser glass doors	.70
1 Front-door bell (18 ft. to Kitchen), brass pull	1.50
36 Iron hooks @ 1c	.36
540 lbs. iron sash-weights @ 1⅝c.	8.80
216 ft. hempen cord @ ¼c., and 72 pulleys @ 4c	3.74
540 lbs. nails @ 4½c.	24.30
Total	$68.18

SASH (Glazed).

Estimate furnished by Bradley & Currier, New York.

Item	Amount
9 Sing. sash, 2′ 6″ x 3′, 1½ 12*l*. Am. gl. @ 1.30	$11.70
9 Sing. sash, 2′ 6″ x 3′, 1½ 1*l*. Double-thick F. gl. @ 1.88	16.92
4 Sing. sash, 2′ 0″ x 3′ 0″, 1½ 2*l*. Am. gl. @ .90	3.60
4 Sing. sash, 2′ 0″ x 2′ 6″ 1½ 9*l*. Am. gl. @ 1.00	4.00
4 Sing. sash, 2′ 0″ x 2′ 6″, 1½ 1*l*. Fr. gl. @ .85	7.40
6 Sing. sash, 2′ 6″ x 2′ 6″, 1½ 12*l*. Am. gl. @ 1.10	6.60
4 Sing. sash, 2′ 6″ x 2′ 6″, 1½ 1*l*. Fr. gl. @ .85	7.40
6 Sing. sash, 2′ 6″ 3′ 0″, 1½ 1*l*. Am. gl. @ 1.50	9.00
6 Sing. sash, 2′ 0″ x 2′ 6″, 1½ 1*l*. Am. gl. @ 1.40	8.40
9 Sing. sash, 2′ 0″ x 3′ 0″, 1½ 12*l*. @ 1.15	10.35
2 Sing. sash doors, 2′ 0″ x 4′ 6″ 1½, 9*l*. Am. gl. @ 2.15	4.30

LABOR.	
Carpenter-work not included in above	6.50
	$2814.84
TINNING.	
120 ft. flushing, @ 10c	12.00
60 feet gutter, @ 16c	9.60
70 ft. leaders, @ 20c (gal. iron).	14.00
PLUMBING.	
Range, without water-back, Stmond's M'f'g Co., "Fawn"	15.00
Cast-iron sink, plain, 20" x 30'	3.00
Suction-pump	3.25
25 ft. 2" waste, @ 25c, put up	6.25
20 ft. 1¼" pipe, @ 30c, put up	5.00
Labor, etc., not included	5.00
Painting. (Estimate, C. H. Ford.)	130.00
	$3,017.94
Cartage and freight not included in above	40.00
	$3,057.91

Mr. Behring will contract for all the above, including builder's profit, etc., for $3,200. "*Home*" reckons $3,200 as an allowable approximation within the terms of the competition. If it were necessary, the price might easily be reduced to $3,100.

Architect's commission, 6%, $192.00.

One of Hyslop's moist-air furnaces, portable, with tin heat-pipes, set up, $135. These last "*Home*" considers as extras within the meaning of the competition.

MIXING COLORS.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — Can you inform me through your paper what is the best elementary work on mixing colors, both in water and oil, for a beginner, and oblige, Yours respectfully, M. E. KNIGHT.

[FIELD'S Chromatography. Any of the Winsor & Newton hand-books on painting, either in oil or water. — EDS. AMERICAN ARCHITECT.]

THE BLUE-PRINT PROCESS.

CINCINNATI, January 18, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Please let me know in your next issue if the blue-print process (blue on white ground), mentioned in your February number, 1882, is the same as that claimed by Albert Levy to be C. L. I's patent of October 25th, 1880, and whether he has a right to this claim. If not, please let me know whether the above-named process is patented in the United States or not. Yours truly,

A SUBSCRIBER.

[WE do not pretend to be experts in patent matters, and have not the means at hand for readily looking up such cases, but "Subscriber" can obtain the full specification of Mr. Levy's patent by sending twenty-five cents to the Commissioner of Patents at Washington. Our impression is that there are several patented processes in use for the same purpose, differing from each other in various details of material or manipulation. — EDS. AMERICAN ARCHITECT.]

FIRE-PROOF CEILINGS.

NEW YORK, January 16, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Although I am not now a regular subscriber to your very valuable paper I read the *American Architect* regularly, and with great interest.

Would you suggest me some material, fire-resisting if possible, to be put on ceilings. Something like linoleum, so that it could be nailed on the beams, and fastened with strips or otherwise. Plastering falls down sooner or later even if done with care.

Yours very respectfully, R. S.

[ASBESTOS felting answers a good purpose; it comes in long rolls about three feet wide, and can be tacked to the beams or furring strips. Where appearance is an object, the best way is to plaster the ceiling on wire-lath, which will hold the mortar so firmly that nothing can detach it. An inferior substitute for wire lathing, which costs less, and can be applied to old ceilings, is Power Bros.' patent wiring process, consisting in driving galvanized nails about six inches apart all over the ceiling, into the furrings or laths, and running diagonal lines of light brass wire across, giving it a turn around each nail, and crossing the ceiling in two directions. After the wires are applied the nails are driven close with a hammer, and a coat of hard-finish put over the whole. — EDS. AMERICAN ARCHITECT.]

THE "BRITISH ARCHITECT" AND MR. RICHARDSON.

ROCHESTER, N. Y., January, 24, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Do you see the *British Architect*, and if so, do you notice what some enterprising sketcher is doing in the way of sending pictures of recent American architecture credited to the wrong party. Of course the blunder will annoy the firm to which the work is erroneously attributed quite as much as the real architect. Doubtless Mr. Richardson will console himself with the reflection that the drawings do scant justice to the buildings, which certainly are among the best work which we have a right to consider American, but it does seem odd that the prevailing indifference to the identity of the architect, of even a successful building, should not have found an exception in the case of one who was able to make such a good choice of subjects for his sketching. Yours,

JAMES G. CUTLER.

[WE understand that the mistake to which our correspondent refers was made very innocently, and without fault of any one. A draughtsman in a Boston office wrote to the editors of the *British Architect*, asking if they would accept and publish sketches of certain buildings which he admired, mentioning at the same time the name of the architect. They returned a favorable reply, and in due time the sketches were received, but the author of them, thinking that his previous letter would prevent any possible mistake as to the name of the architect of the buildings, naturally omitted to mention the matter again, and the editors, just as naturally, having forgotten about the letter, and seeing no indication on the drawings of the architect's name, supplied the deficiency, although with a mark of interrogation, from the printed heading on the draughtsman's second letter, which accompanied the sketches. No doubt they will do all that can be done to remedy any annoyance which the error may have caused. As we have much the same opinion of Mr. Richardson's buildings at North Easton and Quincy as that which Mr. Cutler holds, it gives us pleasure to state that we shall shortly be able to publish gelatine prints of all of these buildings. — EDS. AMERICAN ARCHITECT.]

FURNISHING DETAIL-DRAWINGS FOR ESTIMATING.

ST. LOUIS, January 17, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — A customer of mine complains at not having his detail-drawings furnished at the same time with the general drawings and specifications, claiming that he thereby lost several bids which might have been much to his advantage. This work was begun at the beginning of an extremely busy season, and with no stipulation as to the time when the details should be made.

I have replied that in the absence of any stipulation to the contrary it was understood that the work was to be done in the usual way, *i. e.*, to let the contract from the general drawings and to furnish the details as needed during the progress of the buildings.

This has always been my custom, and so far as I know is the custom of the majority of architects everywhere; and for several good reasons. Experienced mechanics can easily make out their bids from the general drawings, and do so every day. Until the bids are opened the exact cost cannot be determined, nor can the owner decide whether he will build precisely as planned, or make material changes, or decline to build at all. In the latter case details made before the letting become useless and an unnecessary expense to the owner; while if material changes are made the altering of such details may be even more expensive than making new ones entirely, without any compensating advantage.

I would be glad of an expression from the editors of the *American Architect* on the above points. It will be understood that marginal details were provided as usual in the specification and on the general drawings.

ARCHITECT.

["ARCHITECT" is certainly right in thinking that the custom of architects is to leave all detail-drawings except such as may be necessary to explain the work, or may be asked for by contractors while estimating, to be made as the work progresses. Generally, this saves trouble for all parties. To say nothing of the probability that modifications will be made in the design while being carried into execution, which would render detail-drawings previously made useless, it rarely happens that the work actually agrees exactly with the figures on the plans, and endless mistakes and misfits are avoided by making the detail-drawings for finish, not approximately from the plans, but from measurements of the places where the work is to go. In the particular case of which "Architect" speaks, we suspect that the owner has been talking with some disappointed contractor. It is possible that builders might refuse to estimate upon plans for ordinary buildings without full details, but such cases are rare, at least in this country, and our impatient owners would hardly endure the delay which such conduct would impose upon them.—EDS. AMERICAN ARCHITECT.]

THE $300-HOUSE COMPETITION.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I would like to offer a suggestion for the next competition to this effect, that when a builder gives an estimate on a design he be requested to allow his name to be published with it.

This would certainly prevent such a careless estimate as was made for "*Danfors*," as no "reliable builder" would let his name appear against that sum as a guaranty that he would complete the work for it. I know that it would be impossible to build in the vicinity of Boston according to the drawings and specifications, the charming house designed by "*Danfors*" and published in the *American Architect*, of the 20th inst., without a very much larger expenditure of money than he asks for. I would suggest, too, that the estimates be made to cover everything. The *Advertiser* calling attention to the article in the *American Architect*, saw only the added-up columns of figures; but in the specifications both the grading and furnaces are omitted items and important ones too, for which the owner must spend a few hundred dollars more.

It makes the competition an unfair one, putting the more experienced draughtsman to a decided disadvantage; for he, knowing better how much can be done for a fixed sum, would not attempt anything so ambitious. So it seems to me that the fault lies with the estimates, and I do not believe a builder would object to have his name appear with his estimates, since his capability for doing so much for so little would bring him in any quantity of work. C.

[We anticipated that the publication of the detailed estimates and prices submitted in this competition would call out a good many objectors, and when the adverse criticism is levelled at a designer working in another locality than the critic, we are prepared to disregard many things that may be said. In the present case, however, our correspondent *C.* and "*Danfors*" are fellow-townsmen who are building under similar conditions. As to the special points mentioned by *C.*, we will say, without prejudice to the jury's own conclusion on the subject, that grading-up with the excavated material should have been included in the estimate, but not any grading with fresh material. It was left optional with the competitors to include heating-apparatus, or to merely provide for its future introduction. As to questioning the reliability of the estimate because of its apparent inadequacy, *C* is too old a practitioner to be surprised at any instance of the astounding arithmetical feats that even the really "reliable" builder is capable of performing every day in the week. Figures submitted in competitive estimates are usually taken *cum grano salis*, and in the present competition as the "reliable builders" did not have before them the restraining possibility that their bids might be accepted it would be well for those who are tempted

by the published designs and figures to remember to double the dose. *C* will find that a number of competitors have forestalled his suggestion by furnishing as additional proof of their own *bona fides* the names of the builders who figured on their designs, and we hope that in all such cases the publication of the builder's name will conduce largely to his pecuniary benefit. In reply to our inquiry, "*Danfors*" informs us that though his builder does not care to have his name published he has again examined his computations and believes the work can be done for the sum named; at any rate he would be glad to make the attempt. We do not see that the advantage the inexperienced designer has over the more experienced is any greater in this competition than in any other.—Eds. American Architect.]

NOTES AND CLIPPINGS.

Fall of an English Church Tower.—On Friday evening, Dec. 29, the tower of the parish church at Freckenham, in the east of England, fell. The tower was a square one, and contained five bells, which were rung as usual at Christmas time. It had been for some time past in a dilapidated state, and was patched up occasionally. Fortunately, the tower fell away from the church, or its fabric must have been damaged.

The Anarchists and the Tuileries.—The contractors who have undertaken to cart away the Palace of the Tuileries have received some curious proposals and suggestions. Mlle. Louise Michel offers in the name of "a group of anarchists" to remove free of charge "the remains of the former den of tyrants," and she undertakes that the work shall be finished "by the 14th of July, the anniversary of the taking of the Bastille by the noble populace."

The Originator of the Isthmus Ship-Railway Scheme.—In *La Nature* (Paris, December 16) appears a letter from Mons. A. Sebillot, an engineer, complaining that the credit of the details of the Tehuantepec Ship-Railway has been wrongly given to Captain Eads. He says that the proposed method of transport is fully described in a pamphlet which he published in Paris, 1879. He maintains that the project is a far more practicable one than that of the Panama Canal, and that it would be far less costly in money and time.

A new Style of Balloon.—An invention has been discovered in England in aeronautics which promises to revolutionize that somewhat erratic science. "A balloon had been constructed, the lower part of which consisted of very fine asbestos cloth, while the upper portion, which was of canvas, was covered with a fire-proof solution. The balloon was cylindrical in shape, and its cubic contents amounted to about 3,000 cubic feet. The neck of the balloon was provided with a copper spirit lamp, and upon igniting the latter the balloon was filled with astonishing rapidity. The balloon, though only a model, was very nearly as large as an ordinary one, and the rapidity which was attained in filling it is most certainly an advantage which cannot be overlooked. The difference in the cost between the gas required in the one instance and the spirit in the other is, moreover, an item of some importance, while the impossibility of carrying about sufficient gas, as compared with the facility for taking everywhere as much spirit as may be required for a large number of ascents, must strike the minds of those interested in this direction as very favorable."—*Exchange.*

How to Get Telegraph-Wires underground.—The proposition to tax overhead electrical conductors at twice the rate per mile charged for underground conductors is a discrimination in the right course, but only good so far as it goes. It might be improved so as to make the tax an incentive to a prompt removal of overhead wires from the streets. If the tax on underground wires should be made merely nominal for five or ten years, it would put no obstacle in the way of a costly enterprise that is necessarily attended with considerable risk to the investors. But, on the other hand, the tax on overhead wires should be made heavier year by year, until it becomes prohibitory. This is probably the simplest and most effective way of compelling the removal of overhead wires from the streets. If five dollars per mile is a sufficient tax now, it should be raised to ten in 1884, to twenty in 1885, and so on until there are no more overhead wires to tax. But fair warning should be given, so that the telegraph, telephone and electric-light companies may have an opportunity to avoid such taxation by putting their conductors underground.—*Philadelphia Ledger.*

The Burning of Stanford Court.—Stanford Court, one of the most beautiful places in England, has shared the fate of Ingestre and of Clevedon. The priceless manuscripts, one of the best private collections in the country, perished in the flames, and a most interesting series of family portraits of the Tudor period, painted on panels, were burnt; so also was a very fine gallery of old pictures, many of which were of great historical interest. Stanford was a charming old house, built by the Salweys in the reign of Queen Anne, to replace a Tudor manor-house. It stood on a wooded hill in a large park, and commanded grand views of the Teme valley. The house contained numerous secret passages and concealed rooms which were used by Romish priests and perverts in the good old days. It abounded in the most exquisite carved wainscoting. Not long ago a country house of Lord Hertford's, which had just been rebuilt, was burnt down, and £13,000 were lost, as the insurance had been accidentally postponed. Here it is the same thing. There was an old insurance on the house of £10,000, but nothing on the contents. Sir Francis Winnington had been for some time negotiating with an office, and on the very morning of the disaster the forms came down to effect a further insurance of £50,000.

The total damage and loss are estimated at £80,000. Sir Francis and Lady Winnington had gone on a few days' visit to Colonel Butler, at Snakenhurst, near Cleobury Mortimer. Sir Francis arrived at one o'clock, bitterly lamenting the destruction of his ancestral home. The old butler resolutely refused to quit the house, and it was necessary to use force to convey him to a place of safety.—*London Truth.*

Adhesive Power of Nails and Screws.—The extensive use to which nails and screws are put in construction lends considerable interest to any records of experience tending to discover their holding power. Haupt in his "Military Bridges" gives a table of the holding power of wrought-iron 10*d.* nails, 77 to the pound, and about 3 inches long. The nails were driven through a 1-inch board into a block and the board was then dragged in a direction perpendicular to the length of the nails. Taking a pine plank nailed to a pine block with eight nails to the square foot, the average breaking weight per nail was found to be 380 pounds. Similar experiments with oak showed the breaking weight to be 415 pounds. With 12 nails to the square foot the holding power was 542½ pounds, and with six nails in pine 463½ pounds. The highest result obtained was for 12 nails to the square foot in pine, the breaking weight being in this case 612 pounds per nail. The average strength decreases with the increase of surface. Tredgold gives the force in pounds required to extract 3*d.* brads from dried Christiana deal at right angles to the grain of the wood as 58 pounds. The force required to draw a wrought-iron 6*d.* nail was 187 pounds, the length forced into the wood being 1 inch. The relative adhesion when driven transversely and longitudinally is, in deal, about 2 to 1. To extract a common 6*d.* nail from a depth of 1 inch in dry beech, across grain, required 167 pounds; in dry Christiana deal, across grain, 187 pounds, and with grain 87 pounds. In elm the force required was 327 pounds across grain, and 257 with grain. In oak the figure given was 507 pounds across grain. From further experiments it would appear that the holding power of spike-nails in fir is from 460 to 730 pounds per inch in length, while the adhesive power of screws 2 inches long, 0.22 inch in diameter at the exterior of the threads, 12 to the inch, driven into a half-inch board, was 790 pounds in hard-wood and about one-half that amount in soft wood.—*The Iron Age.*

A Tunnel that refuses to remain a Tunnel.—In Castle District, at a point about five miles north of this city, is a tunnel that may be called an ex-tunnel. It is a tunnel that remonstrates against being a tunnel. It was run about four years ago into the side of a steep hill, and was originally about 40 feet in length. When in about 15 feet the tunnel cut into a soft, swelling clay, very difficult to manage. After timbering and striving against the queer, spongy material until it had been penetrated some 25 feet, the miners gave up the fight, as they found it a losing game. Being left to its own devices, the tunnel proceeded to repair damages. It very plainly showed that it resented the whole business, as its first move was to push out all the timbers and dump them down the hill. It did not stop at that, but projected from the mouth of the tunnel a pith or stopper of clay the full size of the excavation. This came out horizontally some eight feet, as though to look about and see what had become of the miners, when it broke off and rolled down the slope. In this way it has been going on until there are some hundreds of tons of clay at the foot of the hill. At first it required only about a week for a plug to come out and break off, then a month, and so on, till now the masses are ejected but three or four times per year, yet the motion continues, and to-day the tunnel has the better of the fight by about four feet.—*Virginia (Nev.) Enterprise.*

Improved Process of Etching Glass.—An appreciable extension of the means of artistically ornamenting glass surfaces has been made by Dr. W. Grüne, of Berlin. Using for the etching functions the familiar fluoric acid, he has initiated the employment of a resisting or partly resisting material in powder. The powdered materials allow the acid to flow between the particles, thus leaving a series of minute spots or holes between each particle, caused by the acid directly getting at the minute uncovered portions of the glass and acting less completely, or not at all, on the portions covered by the resist. The result is a dead or matted surface where the powder has been applied. The pattern may be bright and incised while the groundwork is dead and intaglio; or the pattern may be in intaglio and the groundwork bright and incised. A published description says:—

If the resisting substances are powdered when placed upon the surface of the glass with very finely divided metal copal, or other substances resisting the action of the acid for a longer time, and are allowed to dry on after breaking them with the acid, a more or less matted result is obtained. The corrosive action being very quickly performed, those parts of the pattern required to be bright need not be covered by any resists whatever. Only feebly resisting substances being required which would be useless for the ordinary method of procedure, all the well-known methods of drawing with a brush, pen, stylus, etc., can be employed. The inventor also takes advantage of thin and thick resists, using sometimes fine and coarse materials for powdering, obtaining thereby a matted appearance of different density or grain. In a drawing one can, therefore, obtain different and variegated shading by the simple use of various materials on one and the same surface.

The process is twofold: first the operation by which a matted patter or drawing is put upon the glass; secondly, the process by which a bright pattern may be reserved upon the glass, the groundwork being matted. For the process, the drawing is put upon the object either by hand, transfer, or direct printing, with almost any oil or varnish mixed with a little color to render it visible. It is then powdered by means of a brush or a tuft of cotton wool, or in other suitable manner, with pulverized metal copal or similar substances. What is known commercially as "bronze powder" is considered suitable for the purpose. After having dried, it is dipped into fluoric acid, or this may also be put on with a brush, if desirable. After a few seconds the powder begins to shale off. The glass is then washed in water. The greasy printing colour comes off in the course of the process. The second process is on this wise: Either paint, draw, or print the pattern in a material resisting fluoric acid, such materials being well known. When dry, oil over the whole surface by means of an ordinary printer's composition roller, with a greasy printing colour or oil varnish; then powder, treat with acid, and wasb, as described in the first process. Remove the resist pattern either with an alkaline solution, benzine, alcohol, or like solvent. Instead of applying the acid as a bath or by a brush, it may be applied in the form of fine spray.—*The Artist.*

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A CERTAIN ancient regulation of the town of Boston, dating back to the year 1683, has been giving a good deal of trouble recently to some of the architects and lawyers of that city. It seems that in the latter part of the seventeenth century several destructive fires occurred in what was then the colonial village of Boston, and the royal Governor and Council of the Province of Massachusetts Bay enacted a law for "encouragement to build in Boston with bricke and stone," by which it was ordered that "whosoever shall soo build shall have liberty to sette halfe his partition wall in his neighbor's ground, leaving jags in the corner of such wall for his neighbors to adjoyne their building thereto, and when the same shall be built unto, the neighbor adjoyning shall pay halfe the wall soe far as hee shall adjoyne." In 1692, nine years after the original order, the law was reënacted in nearly the same words, constituting, it would seem, a party-wall regulation as definite, though not as comprehensive, as the provisions of the Metropolitan Building Act itself. In the political disturbances of the succeeding century this regulation seems to have been forgotten, and for many years, unless by express agreement, it has been understood that persons building brick walls must keep them upon their own land, or take the consequences of trespassing upon that of their neighbors. Five years ago, however, a real-estate owner in the southern part of the city built a wall, half on his own land and half on the adjoining estate, and soon afterward the neighboring proprietor appropriated and used the side of the wall which belonged to him, but omitted to pay for it, and instead of doing so gave a mortgage deed of the whole estate, declaring it to be free of incumbrance, which was subsequently foreclosed, and the property sold. The original builder of the wall now sues for the value of the half of it used by his neighbor, on the ground that under the ancient statute he was entitled to build half of it on the adjacent estate, and to be paid for it when his neighbor made use of it, without any special agreement to that effect; while the defendant thinks that the regulation in question, being a mere rule of the colonial municipality, which was never adopted as a part of the law of the State of Massachusetts, has long been void, and that the plaintiff, in trespassing upon his neighbor's territory with his masonry, did so at his own risk, and as he gained thereby additional space inside his building, he cannot complain if his neighbor, instead of requiring him to remove his wall, or bringing action for damages, contents himself simply with using the structure which, under the ordinary rules of real-estate law, becomes his by the fact of its having been erected on his land. A similar case was tried some months ago, but we believe that a definite decision has not yet been given. In the present instance, however, the question will be carried at once to the Supreme Court, in order to obtain a final decision upon a matter of great importance to all who own or manage real property, or build structures of any kind, in the metropolis of New England.

WE have received a letter requesting our "private opinion" upon certain matters of construction, and think the occasion a suitable one to say to all other persons who make similar requests, as well as to this particular correspondent, that in our capacity as editors, while we are pleased to answer the inquiries made of us according to the best of our ability, we wish to do so in such a way that all our readers who may happen to be interested in similar matters may see both the question and the answer, and perhaps profit by them. There are, however, cases in which a correspondent, like this one, makes his application in such a way that we cannot publish it without a violation of confidence which may even do him some injury. Such persons must have their difficulties attended to by one of the editors, or some one of the experts to whom they themselves occasionally appeal, in his private capacity, exactly as in the case of any other client, and as this journal cannot assume the charges which these experts would naturally and properly make for their opinion, unless its readers are to receive the benefit of it, it is often necessary to delay the reply until the question can be modified so as to adapt it for publication. If, therefore, any one who desires to make inquiries of us would have, what we always wish to give, a prompt answer, he should frame his question in such a way that we need feel no hesitation in publishing it, and the reply to it, without discussion or amendment.

THE people of Chicago, by their city government, in their haste to abolish the annoyance of overhead electric wires, some time ago passed an ordinance forbidding the placing of any more wires on poles within the city limits. Hitherto, there has seemed to be no other practicable way of carrying them through the streets, but a contract has recently been made between the Chicago Sectional Electric Underground Company and the American Sectional Electric Underground Company of Philadelphia, by which the right of laying in Chicago the perforated terra-cotta tubes which form the subject of the patents owned by the latter is transferred to the former company. The Philadelphia corporation, although controlling what seems to us the most promising form of subterranean conduit yet invented, has not been able to bring it into very extensive use, on account of the determined opposition of the telegraph and other companies to the attempts made to force them to place their wires beneath the surface, but the case seems to be different in Chicago, where it is distinctly understood that no more overhead wires will be tolerated unless the necessity for them is proved. What will be the result of the contest it is impossible to say, but if the Philadelphia tubes are found to answer their purpose, it will not be long before they will be in great demand.

THE bill for incorporating the Nicaragua Canal Company has been reported favorably in Congress, modified, however, by striking out the clause relating to the guaranty by the United States of interest on the capital stock, and substituting another, which provides that the United States may, if it shall seem necessary for national purposes, temporarily occupy and manage the canal, paying the company in return a sum equal to the net earnings of the canal during the year previous to the occupation, with an annual increase, if the occupation should continue for more than one year, proportional to the regular increase of business in the period just antecedent to the occupation, but with the restriction that the annual payment shall in no case exceed the sum necessary to enable the company to meet its obligations and pay a dividend of ten per cent upon its capital stock, after reserving a surplus for repairs amounting to five per cent of the total sum paid. Nothing, apparently, could be fairer than this proposition, and the promoters of the canal are probably right in thinking that the act of incorporation will be easily secured. Some opposition may be expected from the representatives of the Tehuantepec Ship-Railway Company, and the Panama Company, but the Nicaragua Canal has the advantage of being an American scheme, supported by a large number of persons of high standing and reputation, without having the element of uncertain experiment which has done so much to injure the prospects of Captain Eads's company. In regard to the latter's undertaking it is a little remarkable that a story has been published to the effect that a project for a ship-railway, identical with that of Captain Eads, was described in a pamphlet published some ten or twelve years ago by a French engineer, who now appears in defence of the plan, which he still considers perfectly practicable, although he thinks that his name ought to be substituted for that of his St. Louis rival as the author of it.

A BUILDING surveyor has written to *La Semaine des Constructeurs*, to ask the opinion of the editor upon a dispute in which he finds himself engaged. It seems that he was engaged by a contractor for mason-work to measure a number of buildings, and after fulfilling a portion of his task sent his employer a request for a payment of one thousand francs on account. After a long delay, he received five hundred francs, instead of the thousand that he asked for, and meeting the contractor subsequently with another surveyor he concluded that he had been superseded in his employer's favor. He had still about a dozen surveys to make, but finding that he was likely to have no further employment, he resolved to secure payment of the money for his present services, and notified the contractor that the surveys in his hands would not be completed until he was paid for them. By this sort of persuasion he obtained a thousand francs more, which nearly paid his bill for the work done, but left him with surveys to be completed for which his fees would be about fifteen hundred francs. At this point the contractor undertook to emulate the summary proceedings by which he had himself been brought to terms, and made a sudden demand upon the surveyor for ten thousand francs as damages for the delay in finishing the work entrusted to him. The question was brought before the local tribunal, which appointed an expert to decide whether any damage had been suffered by the contractor, and ordered the surveyor meanwhile to complete at once three of the most important measurements in his care. This order was complied with, but the surveyor, still believing himself right in refusing to deliver them until paid for, desired to know the editor's advice. This was, in brief, that the surveyor was bound to complete his contract with the builder within a reasonable time, if no definite time was fixed; and that he would certainly be responsible for the damage which his refusal to do so might inflict upon his employer. If, however, the contractor refused or neglected to make proper payments for the work done for him, the surveyor might decline to proceed further with his work, and such an abandonment of his agreement would be justifiable, provided the builder was not injured thereby.

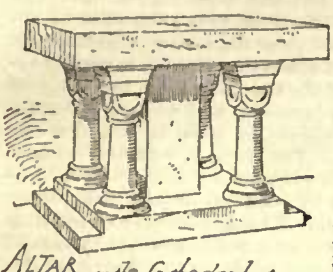
A PAPER was read not long ago before the Conservatoire des Arts et Métiers at Paris, containing a description of some of M. Pasteur's remarkable investigations into the nature of infectious diseases, which seems to have been of great interest. Every one remembers Pasteur's great services in the study of the silk-worm disease, and his subsequent discovery of the microscopic *bacillus anthracis*, which he proved by repeated trials to be the agent, both of infection and death, in the disease known as anthrax, or malignant pustule, or, as the French call it, charbon, which destroys great numbers of sheep every season, and occasionally appears as an epidemic of frightful virulence among human beings. To make sure that he had succeeded in detecting the true agent of infection, M. Pasteur took from animals dying of the disease small portions of the blood, which in fatal cases always swarms with the animalculæ, and inoculated healthy sheep with minute quantities of the dried liquid. In every case the inoculated animals were attacked, after the usual period of incubation, with the same disease, and died, their blood communicating again the infection to others with unabated violence. To ascertain whether the bacilli, rather than any other constituent of the blood, formed the real agent of the disease, M. Pasteur next prepared an artificial liquid from various nutritious substances, and placing a drop of infected blood in this succeeded in inducing the vigorous multiplication of the few bacilli contained in the blood, until the whole of the artificial liquid was filled with them; a colony of these, transplanted into new portions of the same liquid, again reproduced themselves, and on inoculating fresh animals with portions of the last liquid, which had never been associated with any animal body, and was perfectly innocuous in its character, except for the animalculæ which it contained, he found that as before, fatal infection with the original disease was the immediate result.

ONE further step was necessary. It was claimed by some critics that the liquid, not the living germs contained in it, was the active poison, and to determine this point, M. Pasteur filtered portions of it through plates of plaster of Paris, which separated the animalculæ, leaving them on the surface, while the fluid portion ran through. On inoculating new subjects, part with the filtered liquid, and part with the residue left on the plaster plate, it was found that all those treated with the latter died, while none of those inoculated with the filtered liquor suffered any evil effect. The identity of the bacillus, a small, quiescent, rod-like organism, with the fatal infection being now established, M. Pasteur next inoculated birds, but found that that they were unaffected by it, and in endeavoring to account for this exemption it occurred to him that the high temperature of their blood, as compared with that of the mammalia, might be unfavorable to the development of bacillus. He therefore inoculated a fowl, and putting it immediately afterward in a cold place, so as to reduce its temperature to about 98° Fahrenheit, the blood-heat of the mammalia, it died. Another fowl was cooled to the same temperature and inoculated. It sickened, but on being removed to a warm room, where its blood could regain its natural heat, of about 110°, it recovered. A frog, a cold-blooded animal, was next inoculated, without effect, but another, placed after inoculation in a warm room, so as to raise its temperature, died. These experiments were repeated until no doubt was left of the correctness of the principle which they involved, that the anthrax bacilli were noxious only within a certain limited range of temperature, and that when kept in temperatures above or below this range they were inactive. This discovery soon led to another, that inoculation with the infectious germs, rendered partially inactive by a temperature unfavorable to their development, rendered the subject of the inoculation insensible afterwards to germs of the same kind, even in their fullest activity, or in other words, that vaccination with the anthrax poison, rendered artificially inactive by regulated temperature, protected the subject against the original disease in exactly the same way that vaccination with the cow-pox virus protects us against danger from small-pox. To test on a convincing scale the conclusion to which his experiments had led him, M. Pasteur procured sixty sheep, which were divided into three flocks. One of these, containing ten sheep, was set aside, simply as examples of the condition of the others before treatment. Twenty-five sheep, forming the second flock, were twice vaccinated with the modified anthrax virus, one operation taking place two weeks after the other. A month after the last vaccination, the sheep of this second flock, together with twenty-five in the third flock, which had not yet been touched, were inoculated with the virus in its full force, and after the usual period every one of the unvaccinated animals died, while the twenty-five vaccinated ones escaped unharmed. So striking was this demonstration of his theory that a veterinary surgeon demanded immediately of M. Pasteur to be vaccinated with the anthrax. Since that time, M. Pasteur has devoted himself to the study of other forms of infection, and is said to have already discovered the specific poison, as well as the modified virus for protective vaccination, of the typhoid fever of horses, the cholera of fowls, and a disease of pigs. We have before mentioned that the specific poison of pulmonary consumption, now reckoned among the infectious diseases, is thought to have been isolated, and that protective vaccination against this dreadful disease is likely to be successfully attempted before many years, and if this, the most fatal of all known diseases, together with the anthrax, a malady which, if not common, is so virulently infectious that the germs of it, brought up, as M. Pasteur found, by earth-worms from a corpse which had been buried deep in the ground for twelve years, formed a focus of new disease, can be guarded against with as much certainty as small-pox now is, it can hardly be long before similar barriers will be raised against the other contagious maladies which now do so much to shorten the average period of life, and so much more to render that period unhappy and ineffective.

A NEW kind of finish-nail has been introduced in Germany, which appears to the editor of the *Deutsche Bauzeitung* to be in certain respects superior to anything yet invented. Like the other finish-nails used abroad, the new variety is made of wire, but instead of being round, the section of the wire is an equilateral triangle, with concave sides. The stiffness of the nail is much increased by the angular form of its section, and a reduction of twenty-five or thirty per cent in weight can be made without injury to the strength. Moreover, as the surface of the prismatic nail is much greater than that of a cylindrical one of the same strength, its friction in the wood, and consequently its resistance to a force tending to draw it out, are correspondingly multiplied.

FROM BAYREUTH TO RATISBON. — NOTES OF A HASTY TRIP.[1] — III.

Early Romanesque



ALTAR in the Cathedral at RATISBON, Germany.

LITTLE more than an hour in the train took us the next stage on our journey — from Bayreuth to Bamberg. But no change could have been more complete. When we looked out of our window in the morning this change was not, indeed, at first apparent. We looked on the "Vegetable Market," or *Gruene Markt* — a crescent-shaped place, hardly more than a wide street. The houses were chiefly of the seventeenth century, similar to those we had left behind in Bayreuth, and a large ugly Jesuit church rose near at hand. Not a spire was in sight, nothing to show that we were in one of the great strongholds of Romanesque architecture; but a walk about the city, while it gave us the same seventeenth-century elements in abundance, showed also those of almost every earlier date. Although Bamberg was never, even in its greatest days, a first-class German city, it stood high among those of secondary importance, the home of powerful and art-loving prelates. Each age has left a more or less palpable impression on the town. We are not, as in Bayreuth, in an almost homogeneous city, but of course, the great Romanesque epoch stands out more prominently than all others put together, and absorbs all the architectural renown of Bamberg. There are some interesting Rococo buildings, notably near the bridge. The *Baroque* churches are not worse than in other places. There is good Gothic, and good Renaissance work, as will be noted later on, and there is a profusion of Romanesque buildings amid which the Cathedral stands as not only the centre of all interest, but is so preëminent that one must grudge, while in Bamberg, the time spent on anything else, and, in recollection, the words that should in justice be given to other things. It is peculiarly situated — on the top of a steep hill, but so shut in by other eminences and its base so built about by other buildings that it is not visible from the streets of the town, and does not dominate it far and wide, as is usually the case with churches similarly set on high. The streets through which we approach it are narrow and winding, and it is only when we reach the very foot of the hill that we catch sight of the noble structure. The houses on this side, the eastern, are all at lower levels, at the foot or on the slope of the elevation, but still they conceal the church till one is almost below its foundations. So steep is the hill that steps as well as inclines are used to mount it. When the summit is reached we find ourselves in an open square, the eastern side edged with a fine Renaissance balustrade over which we look down directly on the roofs below. To our right as we turn and face the cathedral front is a long, monotonous palace-structure, apparently of the end of the seventeenth century. I forgot to ascertain its date for it was quite uninteresting; but across the square from it, to the spectator's right and flanking the cathedral itself, is what is called *die alte Hofhaltung* or Old Palace, built about 1580 — with a high gable-end toward the square, and near it, giving access through a low wall, an elaborate portal with profuse figure-decoration in high relief — a most interesting example of German Renaissance work in its least classic and most picturesque temper.

This building is separated from the cathedral by a wide interval, so that not only the eastern front of the latter but its northern side are quite free and may be seen to excellent advantage. The west front, on the other hand, one can only study from quite near at hand, and the southern side cannot be approached save through private gardens and a crowd of little houses; but as the east and north aspects are chief in importance the partial concealment of the others does not so greatly matter. The ground slopes rather steeply from the east toward the west end of the church, so that while the foundations of the latter are at the level of the pavement, the eastern apse rises from a high terrace, on either side of which a broad flight of steps leads to the two eastern doors. This fact, combined with the general elevation of the site, is peculiarly favorable to the effect of the splendid building. One's first thought is of delighted astonishment at its excellent preservation. Of course the massive, simple work of this period is always better preserved than one may expect who is more used to the fragility of Gothic. I had not seen any of the great churches of the style, however, — neither Speyer, nor Worms, nor Bonn, — and in comparison with the dilapidation of even the best preserved Gothic, still more in comparison with the front of such a church as the Cathedral at Rouen, for example, which looks like half-melted ice, the almost intact beauty of this earlier building was, if rationally to be expected, none the less a surprise when seen.

I suppose each student of architecture, even of the most superficial sort like myself, has a secret preference for some one style — sunk from memory in the desire for catholicity, disappearing temporarily in the unfeigned delight produced by the sight of a good building of any age, but reappearing in full force in the presence of an actual work of the favorite period. For myself I may say, lest my delight in this church should lead to disappointment in some future pilgrim's mind, that I had always had a penchant for German Romanesque, a feeling that however beautiful and adorable any Gothic building might be, here was a sturdier, nobler style, — a style uniting much of the repose, simplicity and unity we are apt to call "classic," with much of the "romantic" beauty found to a fuller degree in Pointed work. Seeing how well this church had weathered the centuries, when a lesser number had reduced so many of its Pointed brethren to all but dust and ashes, I felt my preference supported by one argument at least. If the building itself did not strike one as perfect, the *style* seemed capable of infinite perfection — capable of hitting the exact medium between massiveness and lightness, between mere strength as such and mere beauty as such. I am speaking now of external effect only. Whatever may be the case with interior construction, one sight of Bamberg confirmed my old idea that in exterior work this was the style that should by rights have been the greatest of modern times. It is Mr. Freeman, if I do not err, who regrets so often and so bitterly that the invading French Pointed killed the German round-arched style, and prevented the nation from developing its architecture in a truly national and individual fashion. That the style at the time of this invasion was fully developed no one can assert, but that it was capable of further progress in its own individual path no one can question. It is not to be supposed that the exigencies of internal construction would have been satisfied with round arches forever; — even here they are partially superseded — but that the introduction of the pointed arch need have been followed by the extinction of all the chief features of the earlier work does not seem evident. In the west towers of this church we see the pointed arch triumphant, but with no loss of Romanesque effect or feeling. And seeing them one imagines that had the style thus developed without foreign help — or hindrance — we should have had something, not better, very likely, than the best French Pointed, but as good in a fresh and different and more nationally characteristic way, — and perhaps a style in which exterior solidity would not have been so sacrificed to interior beauty. It may seem impossible to us that the two things could ever have been united in perfection — the aspiring grace of a good Pointed interior with the satisfying solidity and logical impressiveness of a Romanesque exterior. No one will now attempt, of course, to say how it could have been done; yet, looking at such a church as this, one believes the children of its builders might have found the way. Of course, without the all-embracing later windows we should be without our glass, but I cannot help thinking that even the beauty of the later glass is dearly purchased by the comparative imperfection of a late Gothic apse as seen from the outside.

The reader has a dozen treatises to turn to if he wishes a description of this church. I could not portray it properly even if it had not so often been described. I will only say that no description, no illustration can give an idea of the impressiveness of such work — of its restful, satisfying solidity which is not heaviness in the least, of the delicate decoration which so perfectly holds its subordinate place, never attracting the eye from more important qualities. An impression of unity is conveyed which is rarely felt, I think, in looking at later work. One sees the façade as a whole, — as a building, so to say, — not as an assemblage, however beautiful, of doors and windows and decorative details.

The foreign visitor to Bamberg, who is not very well up in his German history, will doubtless be confused by the names of the local benefactors. One among them is the "Heilige Otto," who must not be confounded with the Emperors of that name, but who was a bishop put in charge of the see by Henry the Fourth, in 1102. He and the Emperor, Henry the Second, with his wife, the Holy Kunigunde, are, so to speak, the patron saints of Bamberg. The latter, in the year 1004, established here, in what had hitherto been an unbroken wilderness, the city and see of Bamberg, as a centre from which Christianity and civilization might be preached to the neighboring Sclavonic tribes. The earliest cathedral was dedicated in her presence in 1012. All the nobles of the land were assembled, we are told, together with forty-five archbishops and bishops, and a Papal legate specially despatched. This church has entirely disappeared, in consequence of a great fire in 1081 and of subsequent rebuildings. All that is known about its character is that it was probably built by a Saxon architect, whom Henry is known to have employed on other buildings in the city; that it was a three-aisled basilica; and that the distinctively German feature of a western, as well as an eastern, apse was introduced. The Emperor filled it with gifts and relics, many of which may still be seen in Bamberg.

The church was rebuilt by Otto der Heilige after the conflagration of 1081. It does not seem to have been entirely destroyed, for we are told that he relaid the pavement, covered the remaining columns with plaster, renewed the frescoes which had decorated the walls, and built a new roof which, together with the tower, he sheathed with gilded copper to prevent a similar disaster in the future; but he entirely rebuilt the *Georgenchor* or eastern end, and the crypt below the present choir, though redecorated since his day, probably remains from this period; for, of course it is not Otto's building, any more than Henry's, that we see to-day. What happened to the structure of the end of the eleventh century we do not know; but by the end of the thirteenth it had assumed an entirely new shape — having grown from the primitive flat-roofed basilica into this splendid late-Romanesque structure, with its pointed vaulting. Contemporary chronicles are exceptionally scanty with regard to this church, but we are told that part of the building was reconsecrated in 1237, and that fresh alterations were begun in 1274 — between which dates the

[1] See *American Architect* for November 11, 1882.

pointed arch had already grown in favor, even for external decorative work.

At the earlier date the east end of the church, the *Georgenchor*, received its present shape. The foundations of the towers, the nave, walls and windows, and the northernmost portal of the east end were probably preserved from the earlier building. To the end of the century belongs the western or *Peterschor*, with its towers and the adjoining transept. One cannot regret, looking at the building in its present shape — as one so often regrets a similar fact in other churches — that an interval of forty years separates the newer from the earlier portions. There is no discord between the two, no feeling that two separate, if allied styles, have been patched together. As I have already said, the first impression given is of complete, though not monotonous, unity. We feel that the style has not changed but grown. There is no abruptness of transition, no lack of connection. The eastern towers are comparatively plain, and their openings are round-arched; the western are much lighter, much more lavishly decorated, with open projecting bays of clustered columns at each angle and with pointed arches throughout; but they group together, whether seen from far or near, in the most perfect harmony. The effect is as homogeneous as though all four had been of the same date, and more beautiful by far than if all had been alike. As I have already confessed, I have never seen either of Bamberg's great rivals, but I cannot believe, so far as one can judge from their pictured aspect, that either of them, though so surpassing the Franconian church in size, can equal it in harmony of proportion and effect. The group of four lofty spires, in two contrasted yet harmonious pairs, so well proportioned to the extent of the simple, logical structure above which they rise, must, it seems to me, be more beautiful than either the four low towers and two still lower octagons which crown the immense extent of roof at Speyer, or the great lantern of Mainz, patched up by later builders and accompanied by insignificant little towers. The eastern end of Bonn is much like that of Bamberg, but the ground plan results in a much less harmonious effect; the western end is Gothic with flying buttresses, which sadly disturb the Romanesque feeling of the rest; and the great central spire seems as much too large for the building as do the towers of Speyer too small. Look at your Lübke, dear reader, and see if I am not right, though I am sustaining the cause of a smaller church against its more famous rivals.

This church has, moreover, quite an especial claim to interest on account of the beauty and profusion and good preservation of the sculpture with which it is adorned. Franconia was distinguished above all Germany, perhaps, and Bamberg above all Franconia, for its sculptured work. Under Henry II a flourishing school had already sprung to life, but between about 1100 and 1260 was the great epoch of the art. To this period belongs the doorway in the east end, already referred to, which leads from the north aisle. Though the portal itself may be, as has been suggested, a survival of Otto's building, its decorations are of this later period. They include a relief in the tympanum which shows the Virgin and child on a throne, and between the side columns life-size statues of St. Peter, Henry and Kunigunde, and the Holy Otto. The great north door of the church is still later and much more elaborate, one of the very finest extant specimens of the German school of sculpture. The tympanum shows the Last Judgment most elaborately treated, with hundreds of figures and immense dramatic force. The statues which fill the niches between the flanking pillars of the doorway are all connected with the main scene. A strongly peculiar type of form and face, and a curious half-laughing expression which is found on almost every countenance — even on the faces of the damned, struggling through the agony which is expressed as well — mark this work as the creation of some sculptor who, though nameless now, was none the less an artist of great individuality and power. Even more interesting are two large statues which, standing on columns, flank the portal on either side. These, which may be seen duplicated in many museums of German antiquities, are said to represent the Church and the Synagogue — the Mother of the Faithful and the Mother of the Lost. The former is not very peculiar in conception, but the latter is, so far as I have seen, a unique figure in the art of the time — a woman with bandaged eyes, holding a broken standard and dropping from her nerveless hand the tables of the law. Both figures are extremely long, slender and willowy — with a delicate, languid and almost affected grace, such as we do not very often find in German sculpture of any period.

M. G. van Rensselaer.

The Rolling Bridge at St. Malo, France.—The old town of St. Malo, in the department of France called Ile et Vilaine, is built upon a small, rocky island, which communicates with the mainland by a causeway artificially constructed. The town covers the whole island, and is of no little importance as a centre of trade and seaport. One of the curiosities of the place, but quite a modern affair, is the rolling bridge, which runs between St. Malo and St. Servan. Rails have been laid upon the ground, which is visible at low water, and over them roll the wheels of the great iron skeleton which supports the platform of the bridge. The movement is by traction, a small steam-engine on one side of the harbor working a cable attached to the frame of the bridge. The tide rises very high at St. Malo, so that when it is up but little of the bridge's support or carriage can be seen, and its rapid movement, when gliding across the channel with its load of human and other freight, and that without any visible agency of propulsion, seems odd enough to the stranger.—*Exchange.*

ART IN PHILADELPHIA.

In certain very important respects the artist's life in Philadelphia is not the happiest one conceivable. Perhaps the public is not very responsive or enthusiastic, and there is in general a lack of that atmosphere which is usually regarded as the one thing necessary to artistic success, and of which certain other cities that could be named are so proud. But there is certainly no lack of such evidence of activity as is furnished by good exhibitions and plenty of them. The Academy's exhibition is followed at a short interval by that of the Society of Artists, at their galleries on Chestnut Street, and the walls of the Academy itself are occupied at the same time by the admirable display of the Society of Etchers.

Neither of these is very well patronized, it is true, either in the matter of admissions or that of sales, and both have doubtless to be carried on at considerable pecuniary loss to somebody. But this state of things is by no means peculiar to Philadelphia; even in Boston I always noticed that somehow the crowds only came on free days. It is probably a part of the plan by which Art advances on the arm of Philanthropy — by which its progress has come to be a "movement," and its teachings a "gospel."

Whatever the merits of the questions at issue that have led to the separation between the Society of Artists and the Academy, it is certain that the Society has shown a good deal of pluck and seems to have enlisted a good deal of sympathy among members of the profession throughout the country: enough to make the current exhibition not only a very attractive one in its general effect, but one that is really representative of many of the best tendencies of American art.

We all admire this enterprising and plucky spirit, of course; but for one, I do not believe there is any real need of the maintenance of the separate galleries by the Society, and I cannot help feeling that it is a great pity that so much good money, and good management, and good feeling should be expended in an enterprise for which the public seems to care so little, and by which I am afraid the profession is not benefited in any important particular.

The Academy officials have made mistakes, I presume, — as, Heaven be merciful to us all, who has not? but it would be very strange if any differences existed that reasonable men could not adjust in a little time, if they went about it in a proper way; for, after all, it isn't as if the Academy here meant a lot of Academicians, ready to appropriate all the good places on the walls at an exhibition, to banish to the limbo of the corridors and stairways, or even to reject altogether, work more meritorious than their own. Such complaints, the standing grievances against academical organizations elsewhere, have never been made here, because our Institution, with its magnificent building and the prestige which its record and the influence of its managers — to say nothing of its income — give, yet presents the delightful anomaly, by which may it ever be distinguished, of an academy without academicians.

Such differences as exist seem to be due only to the mutual incompatibility which unfortunately exists between members of the profession and organized patronage almost everywhere, and while sympathizing with the artists on general principles, I really hope there is not sufficient ground for complaint against the Academy to warrant a continuance, much longer, of the unfriendly division of forces that exists at present.

Meantime the public is, perhaps, considerably a gainer by the activity which nothing develops so well as a little controversy and by the friction which brightens up both parties.

The size of the Society's rooms precludes the exhibition of any very large canvasses, so that these go to the Academy any way; but then so few men find any inducement to paint what are commonly, and with something like a sneer, called "exhibition pictures," that probably very little work has to be sent away on account of its size. Be this as it may, the absence of any very large pictures gives a compactness, perhaps I might be allowed to say, a cosiness to the general effect of the display that is about the first thing to strike the visitor as characteristic of this exhibition, as it was of the one last year. But this is partly due to the hanging too, which, it is to be observed, is first-rate throughout.

The limit of size is reached in Mr. F. D. Millet's portrait of Lawrence Barrett as Cassius; a very good picture, a little frigid, perhaps, but very true to the original and a piece of thoroughly good, if somewhat student-like, painting.

Most conspicuous for its technical merits, as well as for the commanding place which has been given to it on the walls, is Mr. Thomas Hovenden's "Elaine." I am afraid my praise of it will be tempered with so many reservations as to make it seem like something else; but it is certainly praise, and not blame, that I wish to give.

It is easy enough to say it is theatrical, and it *is* theatrical, I own,

not only in the costumes and accessories, but, with a few exceptions, in the characters who are figured and the way they are disposed. If I were to select any one for special complaint it would be the king, who stands by the head of the bier with the letter in his hands which he has just read to the knights and ladies assembled in his hall. Tennyson has managed, throughout, to make us respect the heroism of Arthur, however much he emphasized in him the gentlest virtues; but I am afraid, in Mr. Hovenden's Arthur, the line has been passed which separates gentleness from pusillanimity.

If there were in the poem, to which there is evidently a wish to be faithful, the slightest warrant for his absence I should certainly say there was no Lancelot present. Now if we could be quite sure that this was the case there would be no fault to find with it, but unfortunately we are forced to believe that one of these half-haggard, half-sanctimonious-looking robbers is meant for him. But when we have found what fault we can with the picture let us look at its beauties; they are well worth our close attention. Faults or not, it is an impressive and beautiful work. With the exception of the trace of stage traditions in the grouping of the figures, to which allusion has been made, and perhaps, of the weeping woman, whose grief seems to be more demonstrative than there is any need of, and whose bowed-down figure makes, as I cannot help thinking, an awkward line in the picture — the composition is first-rate. The drawing is admirable, and the color, rich almost to gorgeousness, is wonderfully subtle and sweet. Of these, and of the way in which the figures which are given most prominence are studied — the dead girl, the queen, and the very beautiful female figure in the foreground only the most unreserved praise is to be spoken.

Such pictures are painted under discouragements enough in these days of slender themes and the tyrrany of the commonplace. There is something almost heroic in the attempt, on the part of so strong a painter, to treat so a romantic a subject as this.

The less ambitious, and consequently, more popular work which Mr. Hovenden has contributed is such as to entitle him to the very first place, even if the "Elaine" had not been sent. He has made his home in a delightful suburb near by, and is claimed by the Philadelphia fraternity as one of themselves. He is, as our friends in Third Street would say, the "feature" of the present exhibition.

Mr. Blashfield's "Music" is so much more interesting than anything he has shown here before that one is encouraged to hope that he is outgrowing the brutalizing influences of the school in which he was trained, and which have sadly marred his most important work hitherto exhibited.

Mr. C. Y. Turner has, I think, done nothing so good as his "The Days that are no more" which is exhibited here. It is exquisite in tone; the color though very subdued is very sweet; and the composition full of dignity and grace.

The "Silenced" of Mr. Gilbert Gaul seems to me to come nearer being a worthy contribution to the pictorial record of the civil war than anything that has yet been painted. It is not too much of a subject, and its ghastliness is subdued, not denied, in the treatment it has received. It is night, and the uncertainty of the outlines and the tenderness of the light make the horror bearable, and even touch the scene with a kind of beauty; it is just terrible enough to invite the artist. I question whether he has any business with the hideousness of a real battle, but a little episode like this, and by moonlight, — perhaps we can allow him so much.

If I were to select all the other good works, and try to say something about every one, I should begin with Benoni Irwin's "A Stitch in Time saves Nine," which is a clever picture with a well-worn, but still interesting subject. It is not my purpose to do anything of the kind, however. Readers of the *American Architect* would hardly be interested in the enumeration; besides, I shouldn't know where to leave off.

As a Bostonian, I may be allowed to express regret that Boston art is not better represented, not only in this, but in the Philadelphia exhibitions generally. Mr. Picknell's "Sand-Digging," his "After a Storm," and his two studies of down-east fishermen are among the most genuine successes of the collection, but these are all that Boston has sent, except J. Appleton Brown's "Old Mill, Byefield," which, though a very good picture, indeed, yet does not show very much of those peculiar excellencies which are regarded as chiefly characteristic of his work at home.

The exhibition of etchings at the Academy has all the elements of success except an appreciative public. The exhibition itself is magnificent and, thanks to the superb collection of Mr. Claghorn, which embraces about everything worth having, and upon which the Society has drawn for some six hundred examples of work by contemporary European etchers, is reasonably complete as an exposition of what the art is capable of as practised to-day. It is perhaps to be regretted that in so important a special exhibition, which is not likely to be repeated very soon, the old masters were not included too, even if some of the moderns had been restricted to less than the thirty examples which are allowed them here.

Mr. Haden was received with all the kindness for which Philadelphia is renowned, but his audiences were not enthusiastic, and I am afraid he did not teach them much about an art which he practises so well, nor show them any good reason why the proverb about the shoemaker and his last should not be trusted still.

L. W. Miller.

THE DWELLERS IN CLIFFS.

The archæological and ethnological explorations in the Southwestern territory have been continued with success under the direction of Professor Powell, during the season which has just ended.

The wisdom of Congress in making provision for this work three or four years ago is becoming strikingly apparent as the railroads extend their lines into this, the most interesting region to the archæologist within the borders of the Republic. Private collectors and specimen hunters are now over-running the places which are thus made accessible, and all that remains of scientific interest which is movable becomes their spoil. The already abundant collection of specimens in possession of the National Museum will become priceless as the opportunity for their duplication passes away.

Some criticism has been passed upon the policy of adding to the store of specimens material of the character of that already on hand; but this policy is adopted in order to have the material for exchange with other scientific institutions. After filling its own reserve collection with the most perfect of the specimens, the remaining stores will be arranged in sets, complete or fractional, to be given to the museums and educational institutions in this country, or sent abroad to be exchanged for specimens from other lands which are obtainable only in exchange; as scientific institutions will not usually dispose even of duplicates for money. There yet remains, however, a great field of exploration, which has not yet been entered upon, and which is still too remote from any of the present lines of public travel to be in danger of early invasion by the tourist and amateur relic-hunter. The incompleteness of the work of the exploration may be inferred from the fact that many of the ancient cliff-villages seen by exploring parties during the last three months were merely sketched from the distance. They appeared to be in a remarkable state of preservation, but were not even visited. These villages, so far as could be learned from Indian guides, were never before looked upon by the eye of civilized man. They were inaccessible by any means at the command of the explorers, who of course will not rest satisfied until in some future trip they have reached them and carried away their treasures. The collections made from New Mexico and Arizona already number somewhere between twenty-five and thirty-five thousand specimens of pottery, stone implements, weapons of war, articles of husbandry, musical instruments, and a thousand-and-one things which appertain to and illustrate the daily life of the people who made and used them. Two parties especially charged with the branch of scientific work referred to were sent into New Mexico and Arizona last summer. One, in charge of Mr. Victor Mindeliff, went to the Moqui country in northwestern Arizona to make surveys of the Indian villages and ruins to be found in the region known as the Province of Tusayon. Their work was confined chiefly to the seven inhabited pueblos, which are situated on lofty mesas, or table lands. Complete surveys in minute detail were made of each village, from which models will be constructed sufficiently large to show every feature of interest. From all except one, large collections of household and other articles were obtained. Mr. Mindeliff is the gentleman who last year made a survey of the Zuñi Village, from which the frame model now on exhibition in the National Museum was constructed.

The other party, under the direction of James Stevenson, has recently returned. It took for its field of exploration the cliff-villages and ruins in the Cañon de Chelly and its branches. The main cañon has very rarely been visited by white men, and its branches — some of which are equal to it in extent, in grandeur of scenery and scientific interest — have, it is believed, never before been explored. In fact, only one of them was examined with any degree of thoroughness on this occasion. This branch cañon was named by the explorers the Cañon del Muerte from the fact that herein were found skeletons of some of the ancient cave-dwellers, probably the first which have been unearthed. A series of water-color drawings was made by A. G. Gustin, the artist of the Stevenson party, illustrating the scenery and the relics of the cañon. They convey an idea which cannot be translated into words, of this remarkable place and its contents. The precipitous brick-red cliffs, a thousand feet high, have been carved by the elements into almost every conceivable shape, while the stratification — now regular and level and again distorted as if by an early convulsion — shows in grotesque pictures upon the face of the rock.

The "nests" (no other word is so expressive for the purpose) of the old dwellers herein were built, like those of wasps, in crevices of the cliff. The places selected were too shallow from front to rear to be properly termed caves. They were probably formed by the swirls and eddies of the torrent, ages ago, before it had cut its way down to its present bed, hundreds of feet below. The solid upper crust is left intact, and forms a lofty, sloping roof over a whole vil-

lage. What could have been the character and habits of life of generations born and brought up amid such surroundings, with a sky of dull red rock overhead, with the outer world possibly narrowed to the limits between the two walls of the cañon, and even that outer world inaccessible except by a perilous feat of climbing, such as none but expert gymnasts of this day would care to attempt; a little world upon which the sun could only shine during two or three hours of its daily round? It is to answer these questions as well as may be that the explorers were sent out.

Colonel Stevenson was led to the selection of the Cañon del Muerte, in preference to others which branched off from the main cañon, upon either side, by the representations of his chief Indian guide, who said that ruins of a more interesting character than elsewhere were to be found there. The party entered the mouth of the cañon, and went a day's journey along its bottom until they reached a place beyond which their wagons could not go, and here they established their camp. The walls of the cañon were of nearly uniform height, about one thousand or twelve hundred feet from top to base, always perpendicular, except where great piles of débris, broken from the cliffs, had filled up a portion of the space below; now approaching each other, narrowing the cañon to a mere crevice in the earth less than a hundred feet in width, and again spreading out half a mile apart.

Proceeding on foot three miles beyond the camp, the explorers found the ruins of a cliff-village, so well preserved and remarkable that it more than fulfilled the promises of the guide. The place must have been the home of between two and three thousand human beings. It occupied two "caves" under the same roof, but partially separated by a projection of rock. The extremes of the habitable floor were 1,500 feet apart, while the width from the rear wall of the cave to the edge of the precipice below might have been one-twelfth that distance. The floor of the two wider portions of the cave was studded thick with dwellings built of square stones laid in mortar, all of which were in a state of ruin. An edifice of grander proportions, and almost as well preserved as in the day of its occupation, nearly filled up the narrow space in front of the dividing rock projection to the edge of the precipice.

It would seem from its appearance in the drawings to have been designed for a fortress, though an examination of its interior showed signs of constant habitation, even the finger-marks of little hands and other evidences of the presence of children remaining. The place was upon the face of the eastern cliff, and was accessible at one point only where an accumulation of rocky débris formed a steep sloping ascent from the bed of the stream 300 feet below. That this pile had not existed at the time the village was inhabited was proved by the fact that among pieces of broken rocks were found the remains of buildings which had been undermined and fallen away. Probably access to the place was had only by means of footholds cut in the face of the cliff from below. It is inconceivable that any one should ever have made an entrance to the village from above. The sun, which only became visible from the bottom of the cañon at eleven o'clock in the morning, did not shine upon this village until two o'clock in the afternoon, and three hours later sank out of sight below the crest of the western cliff.

The fortress-like structure referred to consisted of a long, narrow building one story in height, divided into many rooms or dwellings, opening into each other, but having no communication with the outside except through the towers which stood at either end. The largest of these towers — that at the southern end — was three stories in height, with the joists for each of the upper floors projecting two or three feet beyond the outer walls. Holes through the floors formed the means of communication between the different stories, while window-like openings from the second story of the towers, looking out upon the roof of the connecting one-story structure, formed the only mode of exit from the fortress, if such it was. An inhabitant of one of the central apartments of this building wishing to emerge to daylight and pure atmosphere, must have been compelled to pass through the bedrooms and kitchens of all his fellow-tenants upon one side into the tower; then to climb up through the ceiling to the second story of the tower, swing himself by a wooden bar which still remains in place, out of one of the windows upon the roof of his own dwelling, and thence pass by a ladder down to the floor of the cave — the "street" of the village.

If his duty or pleasure led him to a greater distance, he still had the perilous journey before him down the rock ladder, three hundred feet, to the bottom of the cañon.

Many interesting architectural designs were noted by the explorers which cannot be described here. No evidence of the use or knowledge of metals was found; stone implements fashioned all the materials out of which the structure was built, of which fact the rough but careful chiselling of the stone gave abundant evidence. Cross pieces were laid upon the joists for the flooring of the towers, and upon these pieces twigs about the diameter of a man's finger were arranged side by side, but in series which formed a curious mosaic of angles and squares. In the larger division of the cave, and in the smaller division, one of the curious circular structures which might have been the places of worship or perhaps of amusement, of the cave-dwellers, was found.

The structures are common enough in that section of the country, but these were different in many respects from any before examined by the members of the party, and especially different in their interior ornamentation, which was quite elaborate. In one of them a wide band, laid on in bright durable colors, ran entirely around the structure, resembling a Greek fret, with narrower bands above and below, and with the interior spaces filled with curious artistic designs, the meaning of which none of the party could guess. Evidence of the long use of these places for some purpose was found in the fact that some seventy or eighty different thin layers of mud had been plastered upon the interior, each having in its time borne its own ornamentation in colors. The roofs of the buildings were gone and the floors were covered with débris.

It was at this village that the discovery of skeletons was made. J. Stanley Brown, who accompanied Colonel Stevenson, was one morning climbing over a portion of the ruins which had not before been visited, and observed some small round poles projecting from the face of the bluff, to which fact he called attention. By scraping away the débris, human skulls were reached, and further efforts disclosed entire skeletons. A regular burial-place of the ancients had here been broken into; two complete skeletons with parts of two others were found. Great care had evidently been taken to place the bodies away in the manner best calculated to insure their preservation. The place of their interment was in shape like a large oval baking-oven, and the desiccated remains, in sitting posture with knees and chin touching, had been placed within. The contents of the tomb were carefully exhumed and are now on their road to the Museum. Hair of a brownish hue, which may, however, have been black at the time of burial, is still found clinging to one of the skulls; while the shrivelled flesh and skin, as hard as stone, remains upon some of the lower limbs.

Another village in this cañon, of equal extent and similarly situated, though in a more advanced stage of ruin, was visited and some exceedingly interesting discoveries were made. Among the débris of the fallen building sandals, finely woven, but resembling nothing with which the present occupants of this territory are familiar, were found; as also were portions of matting and of garments made from the fibre of the yucca. Evidences of the great antiquity of some of these ruins are mixed with those of later occupancy in a manner most confusing to the archæologist. The Indian guide, George, in reply to an inquiry upon the subject, said that the Navajo tradition went back twelve times the length of the life of their oldest chief, now eighty years of age, and that the ruins existed unoccupied then. This carries one back about a thousand years; but the evidence is hardly valuable.

The party travelled fifteen miles in the Cañon del Muerte and discovered seventeen cliff-villages or clusters of dwellings, some of which it seemed impossible for people to have reached without wings. One curious, snug little village of a dozen or twenty habitations occupies a place which must have been cut into the cliff by the spray from an ancient torrent which came down from above. The track of the stream is unmistakable in the solid rocky crust above. It must have done its work of excavation and dried up long before the advent of the cave-dwellers; for one would as soon think of building under the overhanging cliffs of Niagara as of building there when the waters were coming down. The place is now several hundred feet above the stream which runs through the cañon. The number of ruined villages visited by this party was forty-six, some of which, however, had been visited by the same explorers before.— *New York Tribune.*

THE ILLUSTRATIONS.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, PITTSBURGH, PA. MR. JAMES STEEN, ARCHITECT, PITTSBURGH, PA.

The street fronts of this building, which is about to be built, are to be of Bay of Fundy brownstone, red terra-cotta and Philadelphia brick, laid in red mortar.

HOUSE NEAR THE BRANDYWINE RIVER, DEL. MR. T. P. CHANDLER, JR., ARCHITECT, PHILADELPHIA, PA.

HOUSE OF E. J. SCHWAB, ESQ., PITTSBURGH, PA. MESSRS. STILLBURG & STAUB, ARCHITECTS, PITTSBURGH, PA.

BRIC-A-BRAC MANTEL FOR MR. CAMPBELL, IRONTON, O. MR. E. G. W. DIETRICH, ARCHITECT, PITTSBURGH, PA.

"Placarding" Infectious Diseases. — In discussing the "radical health ordinance" passed by the city authorities of Paterson, New Jersey, *The Medical Record* says with reference to placarding a house in which there is a contagious disease: "This plan of home advertisement of contagious disease has been tried in Chicago, if we remember correctly. It there failed because the people did not like it, and there were constant evasions of the law." The editor has evidently been misinformed. The placing of warning cards on all the houses infected with scarlet-fever was commenced in this city in 1877, with considerable opposition from householders and others who attempted to create a public sentiment opposed to the execution of the law. The State Board of Health, with all the prominent medical gentlemen of the city, sustained the Commissioner of Health in placing the cards, and all opposition has disappeared. A very mild form of scarlet-fever is now prevalent in the city. More than six hundred cards are in place on the outer doors of city domiciles, and the public has become so thoroughly convinced of the propriety of the warning card that citizens make haste to report to the Health Department all cases coming to their knowledge, and which have not been previously reported through the failure of the family to employ a physician. Only small-pox and scarlet-fever are placarded in this city. — *The Sanitary News.*

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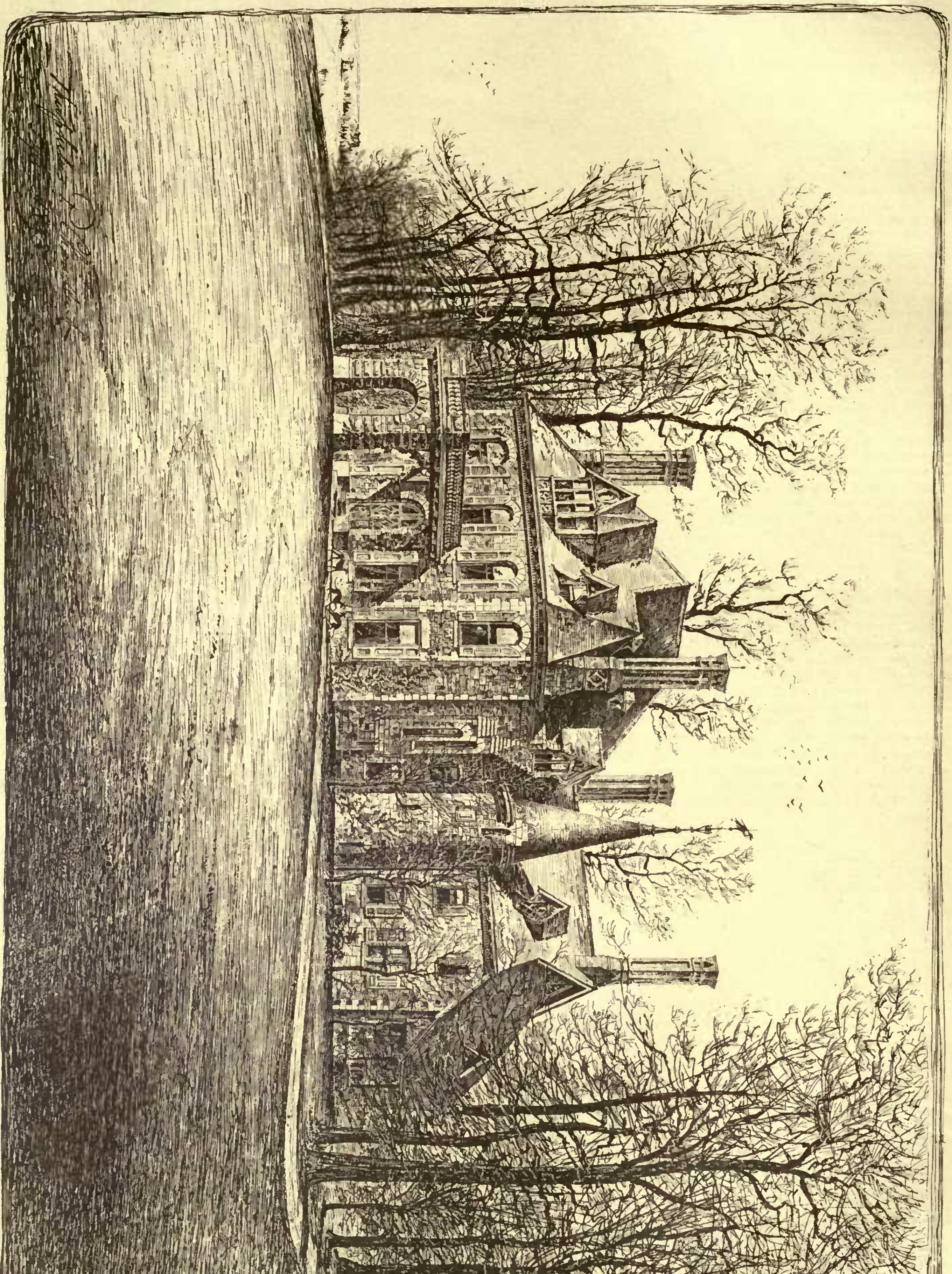

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HOUSE NEAR THE BRANDYWINE RIVER, DELAWARE.

THEOPHILUS P. CHANDLER, JR., ARCHITECT,
302 WALNUT STR., PHILADELPHIA.

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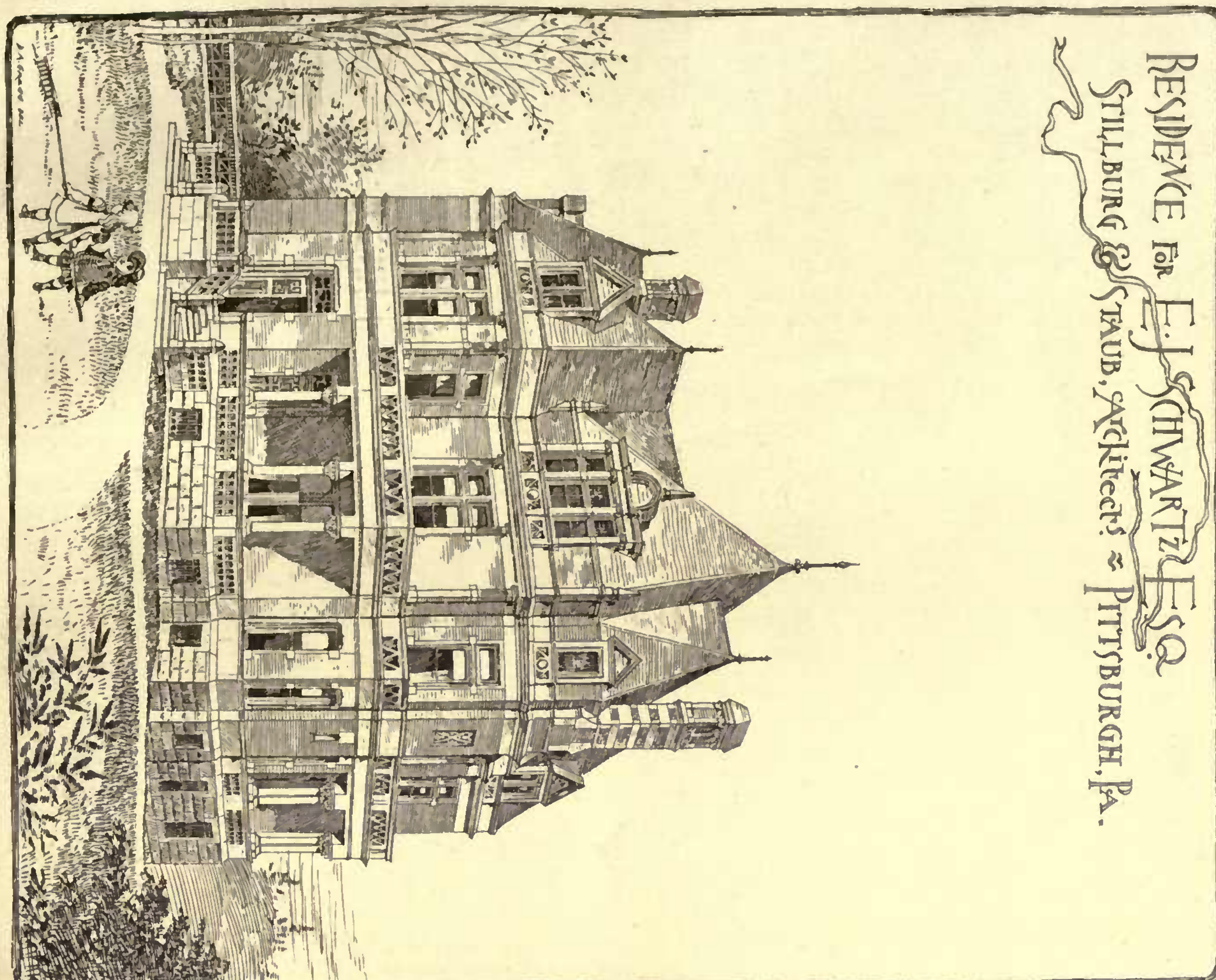

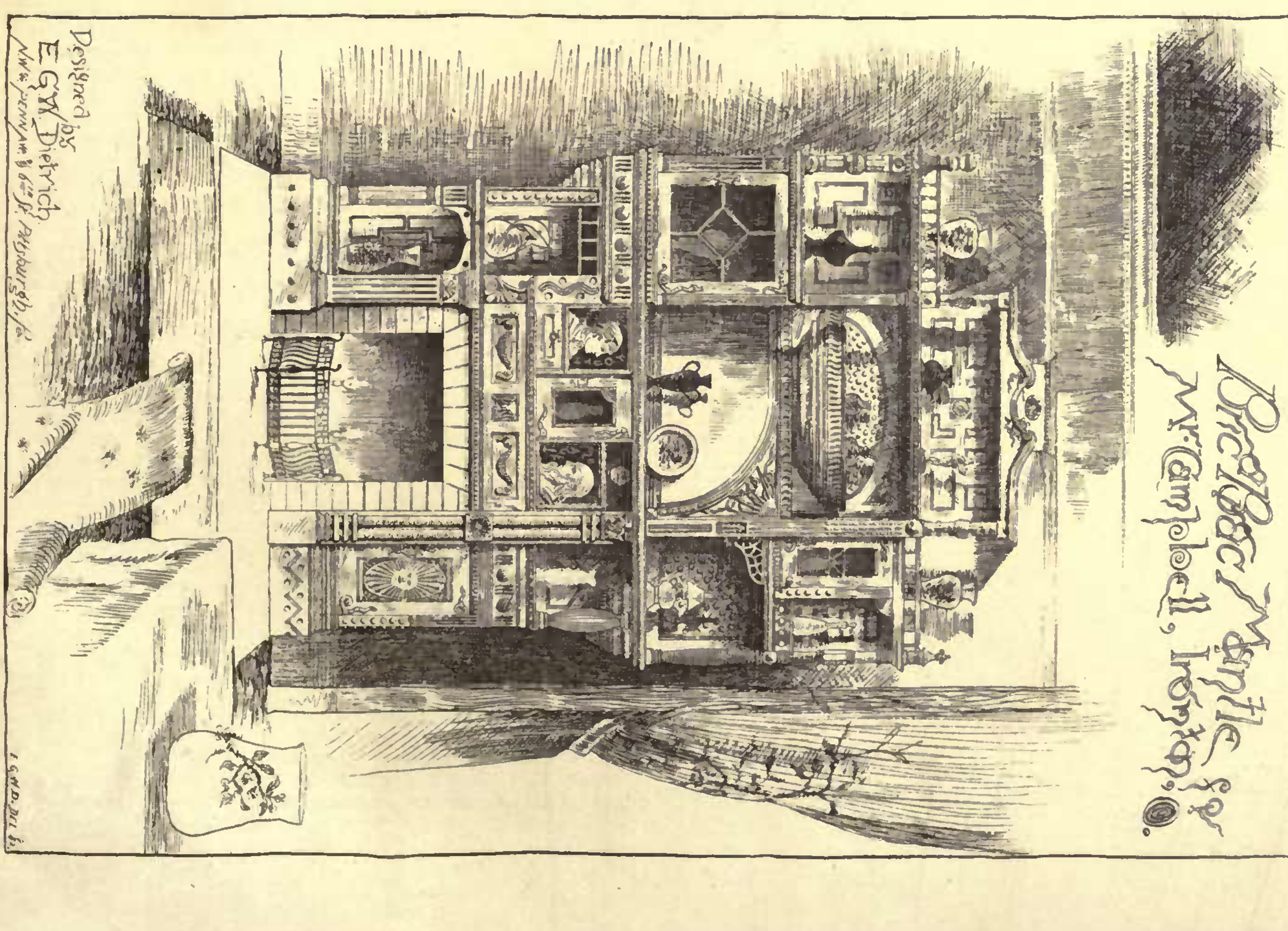

DAMP WALLS.[1]

In a recent issue of the *Badische Gewerbe-Zeitung* appears an article on this subject, the importance of which induces us to reproduce it in our columns, with such additions and remarks as seem to us desirable. The writer, Professor Meidinger, observes that, if in an old house wall-paper turns mouldy and peels off, the cause is dampness in the walls. The walls of an old house may turn damp from various causes: —

1. The rain siekers through a defective roof into the wall, or it penetrates a badly-pointed wall.
2. In the cold season vapor produced from special causes is deposited on cold walls.
3. The wall contains aphronitre (nitrate of lime. Chloride of calcium, which occurs less frequently, displays the same behavior; quarry-stones which remain wet contain probably one of these salts). The wetting of walls in consequence of the presence of hygroscopic salts is caused only rarely by the formation of saltpetre; most frequently sulphates of sodium, and especially of magnesia, show themselves, which are contained either in the mortar or in the bricks. Mortar of dolomitic limestone, which has been burned with fuel containing sulphur, especially has caused very frequently the formation of wet places. Even the presence of sulphuric acid in a damp atmosphere, in districts where much coal is consumed, has given rise to the formation of sulphate of magnesia in quarry-stones, and consequent damp walls, as was proved some time ago in London on façades of limestone containing magnesia (Portland stone).
4. The underground water reaches so high that it rises in the wall of the basement.
5. The house is built on a slope, so that the rain-water running down enters the wall of the basement.

First. The cause of the dampness named first may be removed by repairing the roof, or by repointing the wall. A coating with oil-paint of the outer face of the wall may also be recommended in certain cases. If the outer walls consist of timber and bricks, which cannot be joined closely, the method adopted, especially in mountainous districts, is very serviceable; that is to say, of covering-in the walls of the weather-side with boards or shingles, and for greater durability painting tbe latter in oil. On the Lower Rhine, slate, as used for roofs, is also employed. A cover with metallic slates is likewise to be recommended, and quite recently pressed plates have been used which have the character of shingles. All perfectly water-tight coatings and coverings on vertical surfaces of course keep off driving rains, and prevent the accumulation of dust and the growth of moss and lichen; but they form, at the same time, an impermeable layer, arresting ventilation through the walls, on which account they may prove injurious to health, under certain conditions, in over-crowded houses not provided with artificial ventilation. The duration of such coatings and coverings likewise is not very great, for oil-varnish becomes gradually humid, likely to form emulsions with water, and, when in that state, persistently retains damp, which penetrates also into the interior of the wall. It is evident that walls already damp cannot be dried by such means: that, on the contrary, their drying is prevented. On the other hand, the shingle walls in use in Switzerland, or the protective walls of Solingen plates employed in the country along the Weser, and the plates used on the Rauhe Alb in Würtemberg, besides the slate coverings, are quite to the purpose.

Second. The precipitation of damp and water on cold walls is observed principally in kitchens and in large rooms filled on occasions by large assemblages. In the former case the deposition of damp arises from the steam generated in cooking; in the latter it is caused by the breath of the people collected together. If the walls are painted with oil-color, drops of water are formed which collect on the walls, and in some cases even wet the floor. If the walls are coated with size-color, the water penetrates and makes them darker; as soon as the generation of steam is arrested for a time, they become perfectly dry again. If the walls are papered, the paper-hangings become wet and dark, to dry, however, again very soon and completely. The paper does not turn mouldy, but the paste will probably be destroyed in course of time, and the paper itself discolored. Under such conditions, the outer walls are chiefly exposed to the precipitation of water, especially if they are built of quarry-stones which are good conductors of heat. Brick walls are less exposed to such a deposition, and walls of tufa and wood not at all. If it is intended to protect an outer wall exposed to such precipitations, the simplest way is to board it. The boards of a thickness of 0.4 inches, are nailed to flat beading ⅜ inch to 1.1 inch thick, and secured with hold-fasts to the wall, the intervening space being filled with straw. Thus a very bad conductor of heat is placed nearest the wall, upon which water will not be deposited. The warming of the room is also greatly facilitated by this means; for this reason, such a covering may be recommended in many cases, but especially for north or east walls, and more particularly for bedrooms. The boards are either covered with shirting, upon which the paper may be hung, or they are nailed with reeds (much used in place of laths in Germany) and plastered with gypsum, after which the wall may be treated in any manner desired. The cost of such a boarding is in Germany about 1*s.* per square yard, the shirting 7*d.*, the reed and gypsum coating 1*s.* 6*d.*

Third. Aphronitre is most frequently the cause of permanently wet walls, or such as become always wet in damp weather. It is observed principally in the lower stories. Its origin is due to organic substances containing nitrogen, especially exhalations of men and animals, which lodge in the walls and form nitric acid during their decomposition; the latter, in combining with lime, forms nitrate of lime. Its appearance is therefore most frequently met with in water-closets, in stables, and in the country very often on walls near accumulations of liquid manure. Nitrate of lime is a soluble salt (it is hygroscopic; that is, it absorbs water from the atmosphere, more or less according to the humidity of the air). In dry weather part of the water absorbed during damp weather passes back into the atmosphere. If a wall contains little saltpetre, it becomes light in color and dries in dry weather; during damp weather, on the contrary, it turns dark and wet. Should the wall contain much saltpetre, the wall is permanently wet, as in stables. Paper-hangings on a wall containing saltpetre appear dark during damp weather, and may easily be pulled off. The paste, kept damp for some time, gradually decomposes, and thus loses its adhesive property, the paper hangs loosely even in dry weather, and is held in place only at the permanently dry spots. The adhesive ingredients of colors are likewise destroyed, the colors fall off as dust, mould is formed and the whole appearance is totally deteriorated. The aphronitre possesses the property of spreading to a certain distance from the spot where it originates over the porous wall, through stone and mortar. It thus penetrates the whole thickness of the wall, and arrives, although generally found only on one side, at the other surface of the wall. Quite apart from its ugly appearance, a damp wall possesses other disagreeable properties. The adhesive ingredients of paper and color develop an unpleasant odor during their decomposition; the same is observed in mouldy paper-hangings, and in the timber in contact with damp walls. Effects injurious to health have consequently been often attributed to damp walls, although it would be difficult to prove such an assertion. Various means have been proposed for preventing damp in walls from aphronitre, or at least obviating the disagreeable consequences attendant upon its formation. We select some of the principal means suggested.

(*a.*) The evil cannot be remedied by simply removing the mortar coating, as far as it shows damp, even between the stones, and subsequent fresh plastering. After the mortar has become thoroughly hardened and dry, the wet places appear again after a little time during damp weather, although not quite as large as before. The saltpetre still in and between the stones gradually penetrates part of the new plaster, until it shows itself on the outside. There is no doubt that, even after removing this second plastering and putting on a third, the latter would show wet places, although of smaller dimensions. It might be possible to gradually extract the whole saltpetre from the wall, just as it is possible to remove oil spots from wood by repeated applications of wet pipe-clay. This method of drying a damp wall — although it would effect a radical cure, as long as no fresh formation of saltpetre takes place, and although it would be most advisable from a sanitary point of view — will not find much favor, on account of its inconvenience, tediousness, and expense. In the rare cases where actual formation of saltpetre is the cause of the dampness in walls, in stables, and closets, a coating of dolomite cement, to which some phosphate of magnesia has been added, has proved a very efficient means for preventing the further formation of saltpetre. As the formation of ammonia always precedes that of nitric acid, the ammonia combines rapidly with the magnesia contained in the mortar to form an insoluble phosphate of ammonia-magnesia, and the carbonic acid of the decomposing urine contained in the ammonia unites with the lime to form carbonate of lime. As it is, the not inconsiderable quantity of phosphoric acid contained in urine by itself causes the formation of the insoluble magnesia combination.

(*b.*) It is stated by practical builders that half-cement mortar, that is, ordinary lime-mortar mixed with the same quantity of Portland cement, is the best means for drying the walls of water-closets; no penetration of damp has been observed several years after the new coating has been applied. In Germany, instead of the ordinary Portland cement, Erdmenger's Portland cement of dolomite is considered the most suitable for the purpose.

(*c.*) For some time past it has been tried to prevent the penetration of the saltpetre still remaining in the stones into the fresh plaster by coating the stones and the joints between them with an isolating layer impenetrable by water. Asphalte, either by itself or mixed with linseed oil, has been used; pitch, common resin, and tar have likewise been recommended, the latter, however, less often, on account of its liquid state and its powerful smell. The mass must be melted and applied hot with a brush. It is imperative that the surface of the stones be completely covered, and the joints between

[1] From the *Builder*.

them perfectly closed up; the saltpetre will percolate through the smallest crack, and thus produce wet places on the wall. Before applying the isolating layer, the room must be artificially and very highly heated for several days, to make sure that the exposed stones and joints have been perfectly dried. The asphalte or its mixture with linseed oil must penetrate to a certain extent into the stones to insure a perfect adhesion; this is not possible if the stones are damp. Small places may also be warmed and dried by holding a charcoal pan close to them. Timber which may be in the damp wall must be treated in the same way; in this case it would be advisable to remove the stone-work round the piece of timber as far as it shows damp, to dry the latter well, and then coat it on all sides with asphalte. Upon this isolating layer, which should be from 0.2 inches to 0.4 inches thick without interruption, after hardening, ordinary plaster or gypsum is applied. In carrying out the above, the plaster should be removed, not simply where wet places show themselves, but from 1 foot to 2 feet round them, the isolating mass being applied to the same extent, so as to prevent the saltpetre from penetrating sideways and causing damp spots round the edge of the new plaster. It is not to be expected that the latter should combine closely with the isolating mass; it receives its support sideways from the old plaster still sound. This would be no objection where only small patches of plaster had to be renewed; but large wall-spaces would sound hollow, and probably might become detached unless a close junction of the plaster with the stones were effected by driving in here and there hold-fasts coated with asphalte, before the plaster is put on. A putty of asphalte and mastic, also, was successfully employed at the Allgemeine Hospital of Vienna.

(*d.*) A few years ago tin-foil was recommended as an isolating material. It was put on the wall with paste, after every vestige of the old paper had been removed, the fresh wall-paper being then put on the tin-foil. Although the latter is very cheap (the cost of pure tin-foil in Germany is only 3*s.* 7*d.* per kilogramme, or 1*s.* 9*d.* per lb., with which quantity a space of about 12 square yards may be covered), and the process is very simple, it was soon found that it cannot be put on a damp wall, on account of the paste decomposing. It was next tried to secure the tin-foil with tacks, but the latter soon began to rust; tin tacks might perhaps be more suitable. No case has been recorded in which tin-foil has been pasted upon a wall previously well dried either by natural means or artificial heat. If the wet places are not too large, it might be advisable to paste the tin-foil first on the paper, and, after drying, to put the paper on the wall, care being taken to use paste only for the part of the paper free from tin-foil. The paper would thus lie hollow against the wet place on the wall, where the tin-foil acts as a protector against damp. Lead-foil, in place of tin-foil, is not to be recommended, as lead is attacked by damp saltpetre.

(*e.*) Asphalte paper has sometimes been nailed on damp walls; but in such cases a covering of shirting is necessary for receiving the wall-paper. The cost in Germany is about 10*d.* per square yard. The protection, however, is not permanent, for the asphalte paper lasts only a few years.

(*f.*) There is no record as to the effect of painting damp walls, but it is well known that such a coating after some time blisters and finally peels off. It would be worth while to examine more closely into the question whether this always takes place or only under certain conditions. It is thought that several coatings of paint put on a wall well dried by artificial means would penetrate the same, and unite so closely with the plaster as to prevent a peeling-off taking place. Three coats of paint would in this case cost about 9*d.* per square yard. The paper would have to be put on before the last coat of paint is thoroughly dry, as otherwise the paper would not stick.

(*g.*) If wet places in walls assume large dimensions, it is recommended to face the wall with a brick (or tufa stone) wall or boards. The first is expensive and takes up room; joints with the old wall must be made with asphalted bricks to prevent a transmission of saltpetre. The second remedy is that to be adopted in most cases. The process is similar to that applied in boarding walls outside; filling in with straw, however, is omitted. For greater protection, the boards, as well as the beading fastened against the wall are coated with silicate paint. Such a coating on both sides of the boards costs about 2½*d.* a square yard. The whole expense for fixing such a boarding, including the covering with shirting, but excluding the wall-paper, is at most 2*s.* per square yard. It appears unnecessary to the author to provide for ventilation between the boarding and the wall by leaving openings at top and bottom, as it is not intended to dry the wall. A consequence of induced ventilation would be simply to cause the covered wall to absorb more or less moisture according to the state of the atmosphere, just as if the boarding had not been put, while with sluggish circulation the wall gets damp and dries more slowly, it being impossible to cut off the access of air entirely. By others, the necessity of thorough ventilation between wall and boarding is insisted on, it being pointed out that rapid circulation must tend to decrease dampness and at the same time prevent the otherwise inevitable formation of mould or fungus in the boards.

(*h.*) Quite recently, wood-hangings have been introduced in Germany, serving as isolating layer between ordinary wall-paper and damp walls. These hangings are made in the form of webs or wicker-work of strips of wood or shavings of North Swedish or Finnish pine, 0.04 inches thick, and 1.17 inches to 1.56 inches wide, which are said to resist the effects of damp for a number of years. They are manufactured in lengths of 22 to 33 yards, of a width of 2 feet six inches to 5 feet, and sold it at 1*s.* 4*d.* per square yard. The wood-hangings are fastened to the wall with galvanized nails, the nail-heads being covered with pieces of shavings slipped in, at a cost of about 6*d.* per square yard. A covering of shirting is also in this case applied before putting on the wall-paper. This wicker-work may be directly used for panelling; the panels are produced by beading, and by leaving the whole in that state, or applying coatings of varnish, or painting the several stripes with various oil-colors. Patterns may in this manner be made at a cost of 6*d.* per square yard; one coating of varnish at 2½*d.*; of oil-paint, at 6*d.* to 1*s.*

Fourth. When underground water is the cause of dampness in walls, aphronitre, as a rule, always co-operates. Water alone does not rise so high, as we know from the behavior of cellars, the sole of which very often is only just above the level of underground water, and the walls of which are nevertheless quite dry. The same means of prevention as above mentioned may be employed; they are, however, only palliatives which do not dry a damp wall. A radical cure may be effected only either by a perfect isolation of the wall from the source of the damp, which may be done in existing walls by draining at intervals, and isolating from the ground below by the insertion of sheets of asphalte felt, — or by completely eradicating the damp from the wall. This may be done by stamping-in between the damp wall, which must be previously stripped of its plaster, and a provisional planking, a layer about two inches in thickness, of fresh quick-lime powder. For outside walls the planking may be dispensed with; all that need be done is to dig a trench along the foundation, and fill it with lime. The damp may also be got rid of by heating the rooms with coal-baskets, and by drawing the heated air from the interior by means of a suction-pump connected with a box provided with india-rubber packing, which is pressed against the other side of the wall.

Fifth. When a building is erected on a slope, and the higher wall becomes saturated with percolating rain-water, a cure can only be effected by cutting a deep trench, and thus draining off the water. If substances containing nitrogen and conducing to the formation of saltpetre have been introduced into the wall through rain, the latter will continue to be damp, and the only palliatives against their injurious effects on the inside faces of walls are those already pointed out.

Since the above was written, the *Badische Gewerbe-Zeitung* has published a few additional remarks by Dr. Meidinger. It is stated that in several cases of dampness in walls a coating of oil-paint, upon which subsequently tin-foil has been pasted, has been found efficient. The two substances combine very closely, and permit of the hanging of paper afterwards. The paint must, however, be put on only in dry weather, or after artificial drying of the wall, and the wet places have entirely disappeared. With regard to boarding of damp walls, it is added that it should not be neglected to asphalte the beading to which the boards are nailed, to protect them against the absorption of water and consequent destruction. Moreover, the boards must not be too far away from the wall, on account of mice. The introduction of air-holes is also to be recommended, experience having shown that in their absence the wood becomes fusty. It has already been pointed out that it is advisable to coat the boards with silicate paint, to prevent rotting. This little extra expense should not be spared, for it is by no means yet proved whether air-holes alone will preserve the boarding; moreover, the introduction of openings for ventilation may be inconvenient. In any case, the naked boards must not touch the wet wall, as otherwise saltpetre would enter them and make them damp also. It would, perhaps, be advisable to remove the plaster wherever damp shows itself, before nailing down the boards. The wall would then absorb less moisture from the air, and would lose it quickly again in dry weather; under these conditions, the space between boards and walls would contain damp air for a shorter time, the presence of which is injurious in any case.

Finally, with respect to the introduction of an isolating layer between stones and mortar, we learn from a prospectus lately issued that a special putty, called Weissang joining-putty, has been introduced in Germany, which appears to answer the purpose well. The mass, of the nature of asphalte, but without smell, is boiled with an equal weight of linseed oil, and put on as hot as possible. It is stated that about 2 lbs. of the mixture cover 1 square yard of wall-space. The mass is sold retail in Germany at 1.80 mark per kilogramme (11*d.* per lb). As the price of linseed oil there is about 6*d.* per lb., to coat 1 square yard would cost 1*s.* 5*d.* The mixture is applied in a peculiar manner. The wall is stripped of its plaster, the joints being picked out deeply. The latter are then freshly set with mortar. After drying, the hot mixture is put on, and the wall at once thinly rough-plastered. When the latter has dried, plastering is proceeded with as usual. Under these conditions, a close connection of the plaster with the isolating mass is effected. The latter is recommended also for the protection of gable walls on the weather-side against the penetration of damp; as a substitute for reeds (laths) in plastering on wood; for painting timbers and iron-work in new buildings; for preventing the growth of fungus on wainscoting and other wooden linings; finally, for coating boardings, garden-rails, barriers, posts, tree and vine stakes.

MONTHLY CHRONICLE.

DECEMBER 31. Death of Léon Gambetta at Ville d' Avray, France.
January 1. Burning of the gallery of paintings belonging to Miss S. Gibbons, 1100 Broadway, New York.
January 3. Burning of the Naumkeag House, Peabody, Mass. The inmates barely escape with their lives.
Serious floods in Germany, causing incalculable damage.
Serious rents discovered in the central tower of Peterborough Cathedral requiring the immediate demolition of the affected parts.
January 4. Burning of St. Mary's Episcopal School for Young Ladies, Knoxville, Ill. Only one of the one hundred pupils hurt.
January 6. Earthquake in northern Ohio.
January 10. Burning of the Newhall House, Milwaukee, Wis. Seventy-four lives lost. Many injured.
January 11. Earthquake shocks felt in Tennessee and Indiana.
January 12. Death of Clark Mills, sculptor, at Washington, D. C.
January 13. Car-shed at Allentown, Pa., crushed by snow. Loss, $12,000.
January 14. Burning of the Russell House and other buildings, Milwaukee, Wis. Loss, $100,000.
Burning of the Circus at Berdichev in Russian Poland. Two hundred and sixty-eight persons burned.
Burning of the Planters' Hotel, St. Louis, Mo. Four lives lost. Loss, $30,000.
January 15. The Seneca Hotel at Baldwinsville, N. Y., is destroyed by fire. Five persons injured.
January 16. Kherson, a fortified town of South Russia, nearly destroyed by fire.
Twenty-two earthquake shocks felt at Murcia, Spain. Several buildings destroyed.
Burning of Tweddle Hall, Albany, N. Y. Loss, $250,000.
Earthquake shock throws down two houses at Carlsbad, Austria.
Eleven earthquake shocks felt at Archena, Spain.
January 18. Fall of two houses on East Cambria Street, Philadelphia, during repairs. No one hurt.
Explosion of a calcium-light reservoir at the Grand Opera-House, Milwaukee, Wis. Two persons hurt.
January 19. Burning of the Quincy House, Quincy, Ill., the largest hotel in the city. One person injured. Loss, $30,000.
Gunpowder factory at Muiden, a fortified town of Holland, explodes and nearly destroys the town. More than forty persons killed.
January 20. Explosion of the largest gasometer in Glasgow, Scotland. Eight persons injured. Loss, $50,000.
January 21. Explosion of a Giant Powder factory at Berkeley, Cal. Twenty-three men killed. Thirteen wounded.
The town of Susanville, Cal., destroyed by fire.
January 23. Death of Gustave Doré at Paris.
January 24. A portion of Ward 2, Wilkes-Barre, Pa., sinks five to ten feet because of the caving of mines beneath the city, causing much damage to buildings.
January 25. Opera-house at Defiance, O., burned. Loss, $45,000.
January 26. Partial burning of the Milwaukee College for young ladies, at night. The sixty pupils saved unhurt.
Gas explosion in a steam-heating pipe man-hole, New York. Four persons injured.

THE CALCULATION OF GIRDERS.

TOPEKA, KAN.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — The series of articles on "Girders," which have recently appeared in your journal, will undoubtedly be of great service to many draughtsmen and architects who are willing to spend the time and mental effort to become familiar with the processes there expounded. But it seems to me there are several errors in statement and conclusion, the correction of which would add materially to their value. The first matter to which I would draw your attention is that of the question of shear in a bent beam. The author says (No. 356, p. 193), "since the shearing-strain acts at right angles to the girder, *the additional area* required to safely resist it will vary directly as the shear itself." Why additional area? It seems to me that the section of a beam should be fixed by the bending moment, and that almost invariably (especially in the case of prismatic beams) this section will be more than ample to resist the shearing action of the load. After examining the authorities on the subject, I see no reason for changing my opinion. The author appears to think that the shearing stress in a bent beam goes directly to aid the stress from bending moment in rupturing the beam, and therefore that more material must be added; whereas it is commonly accepted as true that the shearing stress in a bent beam is distributed over the section of a beam, so that it is a maximum at the neutral surface and 0 at the extreme fibres; the distribution of stress from bending being, on the contrary, a maximum at the extreme fibres and 0 at the neutral plane. The foregoing is reason enough, it seems to me, for regarding the author's *general formula* for additional section as simply an approximate formula for the total section required, if it should be necessary to proportion a beam for shear alone. Prof. Rankine says (*Civil Engineering*, p. 267): "The smallest cross-section of a beam is generally fixed by reasons of convenience, independent of the shearing force to which it is exposed, and *is generally much greater* than is necessary in order to bear that force; but when it is practicable to adapt the least cross-section of the beam accurately to the shearing force, the preceding formulæ and table furnish the means of doing so by making $q_0 = \frac{f'}{s}$; where f' is the modulus of rupture by shearing, and s a factor of safety. This equation gives for the least sectional area,

$$A = \frac{q_0 A}{F} \cdot \frac{F}{q_0} = \frac{q_0 A}{F} \cdot \frac{sF}{f'}."$$

in which formula $\frac{q_0 A}{F}$ is a constant dependent upon the cross-section, and is given in the table previously referred to, for various forms of section;" that for a rectangle being $\frac{q_0 A}{F} = \frac{3}{2}$, which would reduce the general formula above to $A = \frac{3s.F}{2f'}$, for rectangular wooden beams, in which A = area of section, and F = total shearing force.

For a thorough exposition of this subject of shear, see Rankine, *Civil Engineering*, pp. 266–268, etc. Applying the above formula to *Example* 1 (p. 241) of Prof. Ricker's article we have, $A = \frac{3 \times 5 \times 4}{2 \times 1.24} = 24.2$ square inches as the total sectional area required, and as the beam is already 16″ x 18.75″, it would seem to be amply large.

Authorities are agreed that transverse shearing force has no material effect upon deflection, so that even if the Professor's theory were correct, he has already added 1.62 inches to the depth of the beam above that required for breaking load; also by adding this 1.01 inches to *depth* of girder, he has increased its capacity to resist deflection far beyond that necessary, as deflection varies as the cube of depth. This additional depth for shear might look necessary if the Professor's theory were true, in the case of a beam loaded at the centre; for here the shear would be the same from point of support to load, where it changes sign; but in the case of a beam loaded with a uniform load, or loads placed at various points, the shear would almost invariably be a maximum where the beam was subject to a bending strain of only a small proportion of the maximum moment; so that it is very difficult to see why a beam loaded as in *Example* 2, Case 2, should have any material added to resist shear, even when a beam with centre load requires it. The next matter which seems to me to be open to criticism is the statement in regard to the area of "inertia" figure (No. 359, p. 229), where the author says: "Draw a series of horizontal lines across the figure, at equal distances from the horizontal previously drawn through intersection of the tangents, and from each other. Measure the length of that portion of each line included between the equilibrium curve and its tangents. Take the sum of half the upper and lower ordinates and the entire intermediate ones; multiply this sum by the vertical distance between two adjacent ordinates. This product will be the required area, though slightly in excess because practically substituting a polygon with short sides for the equilibrium curve. It differs very little from the true area, which it approximates the more closely, the closer the horizontals are drawn to each other." Now I think it will appear, from what follows, that this statement is only true when the distances from horizontal through centre of gravity to horizontals through tangent points are commensurate, and the divisions are a common divisor of these distances, and then only by making this statement so *very general* that the upper and lower ordinates are taken to be 0; a circumstance that would be hardly noticed by the draughtsmen using this method. The correct formula for the area of figure *n. h. m.* (see Fig. I.) in which *S Y* and *S R* are commensurate, and in which the end figures, *n a b* and *m i k*, are taken as triangles, and the remaining divisions as trapezoids, is $A = x \left(\frac{ab+ik}{2} + \frac{ab+cd}{2} + \frac{cd+ef}{2} + \frac{ef+gh}{2} + \frac{gh+ik}{2}\right)$ which reduces to $A = x\,(ab + cd + ef + gh + ik)$, or x (the common distance) into the sum of the ordinates. Now, considering the extreme ordinates 0, the Professor's statement would be equivalent to this. Again, taking *any* small distance, x, and spacing it off above and below the horizontal line through centre of gravity, there will be a triangle formed at each end of inertia figure, whose perpendicular, let fall from the tangent point on its base, the last ordinate produced, will be always less than the constant space, x. But by following the rule in its only correct interpretation, and considering the end ordinates 0, this perpendicular would be made equal to x for both end triangles, and we would therefore obtain an area in excess over and above that obtained by considering the equilibrium curve to be made up of straight lines between ordinates. The statement made in the text is correct for a figure of this form, as

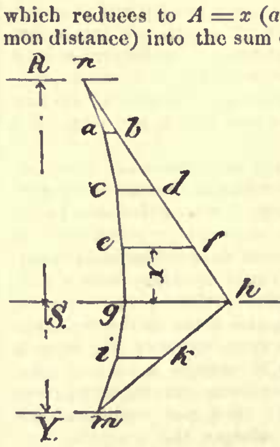

Fig I

will be readily seen by making a summation of the small areas, assuming them to be trapezoids, and should only be used for these inertia figures when the distances above and below the horizontal are divisible by the constant distance x, and then only by considering the extreme ordinates to be 0. The above may account for the fact that the area of inertia figure in Figure 66, p. 229, is stated in the text to be 14.41, is written on the figure 14.49, and that a literal application of the rule would make it 14.50 as nearly as can be determined from the minute and obscure figures. I think the following will give a close approximation to the true area, and in fact would give the exact area if the equilibrium curve were composed of straight lines between the extremities of ordinates: Divide the distance between horizontal through centre of gravity and horizontal through upper tangent point into any number of equal spaces, as small as practicable; divide the distance between centre-of-gravity horizontal and horizontal through lower tangent into any number of

equal spaces (not necessarily the same as those above the centre-of-gravity horizontal); draw horizontal lines through the points-of-division above and below. Measure the lengths of all the ordinates between tangent and equilibrium curve; then if the perpendicular distance between the ordinates above the line is x, and that below the line is y, the area of the inertia figure will equal x into (the sum of all the ordinates above the axis and one-half the ordinate measured on axis) plus y into (the sum of all the ordinates below axis plus one-half the ordinate measured on axis).

Perhaps a reference to a figure and algebraic expression will avoid ambiguity. See Figure II.

$$\text{Area } efm = y\left(\frac{ef+gh}{2}+\frac{gh+ik}{2}+\frac{ik}{2}\right)$$

$$= y\left(\frac{ef}{2}+gh+ik\right)$$

$$\text{Area } efn = \times\left(\frac{ef}{2}+cd+ab\right)$$

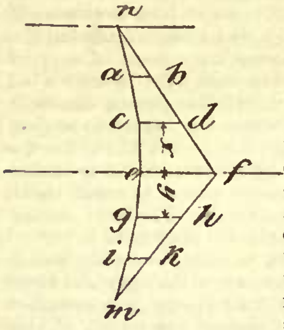

Fig II

Of course it will not be necessary to scale the differences x and y, as they can be obtained by dividing the known distances from axis to extreme fibre by any desired number.

On page 203 of number 357 the Professor says, in reference to a girder composed of several timbers laid one on the other. "If the timbers are not fastened together, the strength of such a girder will be little more than the sum of the strengths of the timbers taken separately. . . . but if firmly fastened together so as to prevent all slipping, the girder would act as a single beam of equal depth. . . . Letting n = number of timbers of which the girder is composed, the girder would then be very nearly n times as strong as if the timbers were merely laid on each other and not fastened." And again, speaking of girders such as that represented in Figure 44: "A key at each end will usually be sufficient, since no slipping can occur if the ends are fixed." Now, by reference to *Example* 7, page 242, number 360, it will be seen that two timbers bolted and keyed together as above described are treated as if they were separate, and the sum of bending moments that each would bear separately is taken as the amount that the compound girder would bear. The *exact* strength of no girder can be calculated, but it would seem as if a sufficiently exact approximation of the strength of this girder could be obtained by either the graphical method or by direct calculation; for considering that the centre of gravity of the girder, as a whole, can be readily found, the moments of inertia of the beams, separately, can be easily calculated, and then the moment of inertia of the whole figure, obtained by adding in each case, the area of section of beam into the square of the distance between axes.

Proper allowance should be made for bolting, keying and gaining-in joists, but the latter is the only weakening that needs much consideration; the bolts and keys can be placed where the strain from bending is not a maximum. It seems to me if the joists were properly bridged there would be little need of gaining them in. At any rate the moment of inertia could be taken at the weakest point where one of the joists is gained into girder. It really seems like a great waste of material to make the calculation as in the example, especially when we consider that the deflection varies as the cube of the depth, and that this girder is calculated with reference to the deflection. It is to be hoped that the articles will be completed by some discussion of many matters which come up in designing girders, such as: the stiffness of vertical web to resist buckling from shear; the methods of making joints in riveted girders; the proper spacing of rivets or other fastenings at the joints, and between the web, and flanges, etc. If these matters are left untouched they will arise to plague any draughtsman who attempts to design a built girder. Hoping that the above will be of some service in arriving at a proper understanding of the subject, and that I have not trespassed too much on your valuable time, I remain, Respectfully,

J. W. P.

THE $3,000-HOUSE COMPETITION.

MILWAUKEE, WIS., January 30, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — The *Architect* of the 27th is just at hand, and "*Try*" feels very much gratified to think that his rendering of the problem meets with sufficient approval to warrant its publication.

He notices in the estimate that under the head of Second Story, last line but one, "Floors all in matched fencing" has an interrogation mark after it. It probably occurred to "*Try*" at this point that it might be thought that he had omitted the item of flooring which is all included in second item under carpenter-work. It would have been better if the remark had been made in some other place.

Also in specification under "Carpenter," "Lining-Boards" should read "planed and matched fencing" instead of "furring," as printer has it.

It is customary here in this section to use second-quality pine, matched and planed one side, for lining-boards and floors in good work, and it goes under the name of matched fencing.

Perhaps "*Try*" may be admitted an additional word; he notices that he has said nothing about builders' profit. The estimates are on a basis of ten per cent margin.

Press of office duties had made him somewhat short of time, and the final writing and summing up were done on the last day which would enable them to reach Boston in time. The Newhall-House fire came on the same day, and with its attendant loss of life "*Try's*" mind may not have been quite as steady as he generally means to carry it. At all events he sees some things in both specifications and estimates that another writing would put somewhat differently.

He is very confident from experience that he can build the house here for the money. Yours very truly, "*Try.*"

THE SAN FRANCISCO VETERANS' HOME COMPETITION.

SAN FRANCISCO, CAL., January 23, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Business is rather quiet at present but prospects good for coming year. Labor and materials same as last quoted. It may be of interest to you to know of the last fiasco here in regard to competitions, viz: — The Veterans' Home, to be built by popular subscription. To begin with, when the project was first brought forward an offer was made to members of the organization to furnish plans and specifications as a donation, and several months after, when asked in reference to the matter, the offer was agreed to. Then came a squabble in the management, and advertisements calling for a competition; which, of course, gave the architect first-mentioned an honorable chance to withdraw his offer. The amount tendered as a premium was ridiculously small, and only three architects put in plans. Messrs. Kirby & Son estimated cost $12,000; Messrs. Newsom (who style themselves *East-Lake* architects), $10,000; and Messrs. McDougall & Son, $17,000. The advertisements called for buildings not to exceed $10,000. Hence Messrs. Newsom, who offered bonds to complete the buildings for the sum named, were really entitled to the premium; and next in order the Messrs. Kirby. But after allowing Mr. McDougall to take his plans, and make alterations and re-submit them, the decision was in favor of Messrs. McDougall & Son.

The coolest thing throughout has been the way the money has dwindled down from some thirty odd, to seventeen thousand dollars now remaining in the fund, and the confident way in which the managers say if the buildings cost more than $17,000 the public will contribute more to the fund. Messrs. Newsom have charged unfair dealing, and righteous indignation is the answer. But this is a fair sample of the result of offering to architects such *large* inducements.

S.

NOTES AND CLIPPINGS.

A WATER-PROOFING COMPOUND FOR BRICKWORK. — For water-proofing brick walls the following has been given. Dissolve soft paraffine wax in benzoline spirit in the proportion of about 1 part of the former to 4 or 5 parts of the latter by weight. Into a tin or metallic keg place 1 gallon of benzoline spirit, then mix 1½ pounds or 2 pounds wax, and when well hot pour into the spirit. Apply the solution to the walls whilst warm with a whitewash brush. To prevent the solution from chilling, it is best to place the tin in a pail of warm water, but on no account should the spirit be brought into the house, or near to a light, or a serious accident might occur.— *Van Nostrand's Engineering Magazine.*

A MONARCH OF THE FOREST. — H. Tabor & Sons, Manistee, Mich., write that they recently cut a pine tree, at their camp in Section 21, Township 25, Range 5, on the Big Manistee River, that was 164 feet long, 100 feet from the ground to the first limb, and as round as a dollar. Eight logs were cut from it that measured as follows:

LENGTH, FEET.	DIAMETER, INCHES.	SCALE, FEET.
16	42	1,444
16	41	1,369
16	41	1,369
16	39	1,225
16	37	1,089
16	36	1,024
14	29	547
16	25	441
Total..126		8,508

It would seem that 8,508 feet is about enough for the logs of one tree to measure, even if none of them got away, but in this case the returns are imperfect, from the fact that the log, which would have made two more logs, was so badly broken as to render it of no value. Tabor & Sons are of the opinion that this is the largest tree ever cut on the river. — *Northwestern Lumberman.*

HAIR *vs.* WROUGHT-IRON. — The *Mechanical Engineer* reports a curious effect produced on a wrought-iron forging by a human hair. The forging was in a cold press, that is a powerful press for finishing the forging after it is shaped. During this process it is put between two hardened steel dies and subjected to a pressure of 200 tons to the square inch. At one of these operations a hair taken from the head of a bystander was placed on the face of the forging and the full pressure applied. The result was that the hair was driven into the forging and imbedded in it. The hair itself was uninjured during the operation and was removed intact by Mr. Manning Merrill of Merrill Brothers, Williamsburg, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

WAREHOUSE. — Mr. Chas. L. Carson, architect, is preparing drawings for Mr. E. Bamburger, for a five-st'y and basement warehouse, to be built on Lombard St., for Mr. Howard. It is to be of brick, with stone and terra-cotta finish, 35' x 170', and to cost about $30,000.

BUILDING PERMITS. — Since our last report twenty permits have been granted, the more important of which are the following:

Lawrence Turnbull, 6 three-st'y brick buildings, n s Hoffman St., cor. of Chester St.

Jas. D. Hodges, 20 two-st'y brick buildings, w s Bruce Alley, between Saratoga and Mulberry Sts.

Otto Duker & Co., three-st'y brick warehouse, n w cor. Canton Ave. and Albemarle St.

Valentine Roberts, 2 two-st'y brick buildings, s s Chew St., e of Wolfe St.

Henry Waterman, 5 two-st'y brick buildings, e s Fremont St., s of Presstman St.

John H. Garrettson, 5 three-st'y brick buildings, n s Harlem Ave., between Arlington and Carrollton Aves.

Henry Westphal, 9 two-st'y brick buildings, s s Bloomsburg St., between Light and Byrd Sts.; and 11 two-st'y and basement brick buildings, n s Barney St., between Light and Byrd Sts.

John Schmidt, 5 two-st'y brick buildings, w s Vincent Alley, s of Thompson St.

S. O. McComas, 6 two-st'y brick buildings, e s Cole St., e of Gilmor St.

Louis Adler, five-st'y warehouse, 28' x 77', n s Lombard St., w of Front St.

Chas. Kerndl, three st'y brick building, with two-st'y dyeing-house in rear, w s Gay St., between Front and High Sts.

Boston.

BUILDING PERMITS. — *Wood.* — *D St., Nos.* 217-219, Ward 13, for Michael and Hugh H. Campbell, 2 three-st'y flat dwells., 20' x 32'.

Florence St., near Ashland St., Ward 23, for Matthew Quigley, two-st'y pitch dwell., 23' x 28'; ell, 14' x 21'; Alexander Rogers, builder.

Cottage St., near Dudley St., Ward 20, for Emma Mills, two-st'y pitch dwell., 21' x 30'; ell, 16' x 22'; James C. Mills, builder.

Chelsea St., No. 333, Ward 1, for Alfred B. Wilton, one-st'y pitch mechanical, 21' x 33'; Walter D. Johnson, builder.

Nonantum St., near Oak Sq., Ward 25, for Patrick J. Curley, 2 two-st'y pitch dwells., 11' 6" and 17' x 29'; Jas. Keefe, builder.

Newman St., No. 5, Ward 15, for Henry Grimes, two-st'y flat dwell. and store, 20' x 36'; Henry Grimes, builder.

Washington St., near Neponset St., Ward 24, for Boston Gas-Light Co., storage, 20' x 20'; Benj. Tarbox, builder.

Tremont St., near Whitney Court, Ward 22, for Bernard Krickser, three-st'y hip dwell., 15' and 22' x 49' 6"; McDonald & Tobin, builders.

Brooklyn.

BUILDING PERMITS. — *Hart St.*, s s, 90' e Sumner Ave., 3 two-st'y and basement frame dwells., tin roofs; cost, each, $3,000; owner, Thos. Moore, Sumner Ave., near Stockton St.; builder, J. Rueger.

Lewis Ave., w s, cor. Hart St., 3 two-st'y and basement frame dwells., tin roofs; cost, each, $3,000; owner, etc., same as last.

Sackett St., n s, e s cor. Gowanus Canal, one-st'y frame shed, slated roof; cost, $6,800; owner, the Municipal Gas Co., 312 Fulton St.; architect, J. F. Harrison; builder, R. Deeves.

Herkimer St., n s, 200' w Hopkinson Ave., 6 two-st'y frame dwells., gravel roofs; cost, each, $1,600; owner, G. H. Bishop, New York City; architect, G. H. Chamberlain.

Suydam St., s s, 320' e Broadway, two-st'y frame tenement, tin roof; cost, $3,500; owner and builder, John Zoellner, 100 Graham Ave.; architect, W. Clement.

Union Ave., Nos. 6 *and* 8, e s, 25' n Broadway, 2 four-st'y brick buildings, tin roofs; cost, total, $10,000; owner and builder, Louis Bossert, 1830 Johnson Ave.; architect, T. Engelhardt.

Evergreen Ave., e s, about 15' from Melrose Ave., toward Georgia Ave., three st'y frame double tenement, tin roof; cost, $4,000; owner, J. Thieling, Evergreen Ave., near Georgia Ave.; architect, L. Scheinger; builders, H. & D. Cook and J. Pohlman.

Bushwick Ave., e s, 25' n Maujer St., three-st'y frame double tenement, tin roof; cost, $4,200; owner, Michl. Simon, 262 Devoe St.; architect, G. Hillenbrand; builder, D. Kreuder.

Bushwick Ave., n e cor. Maujer St., three-st'y frame store and double tenement, tin roof; cost, $5,000; owner and builder, Peter Kaiser, 210 Teneyck St.; architect, G. Hillenbrand.

Cincinnati.

RAILROAD SHED. — The I. C. St. L. & C. Railroad have lately contracted with Mr. M. Clements for an additional shed for the new depot they are building in this city, 86' x 300'; cost, $20,000, to be built of iron, and to have Rendle's patent skylights.

BUILDING PERMITS. — C. R. Mabley & Co., four-st'y brick building, Fifth St., between Walnut and Vine Sts.; cost, $2,500.

Samuel Kuhn, 4 three-st'y brick dwelling-houses, Richmond St., between Cutter and Linn Sts.; cost, $20,000; Mr. Samuel Hannaford, architect.

Frank Byers, repair store front, Nos. 5, 7, 11 West Fifth St.; cost, $2,500.

C. Bassenhort, three-st'y brick dwell., Spring Grove Ave., near Liberty St.; cost, $5,000.

Lawrence Beck, three-st'y brick building, Elm St., near Green St.; cost, $4,500.

H. Quencel, two-st'y brick dwelling, Marshall Ave., near Moulton St.; cost, $2,500.

Louis Stix & Co., seven-st'y brick warehouse, Vine St., between Race and Elm Sts.; cost, $20,000.

Mrs. L. Rover, four-st'y stone front store, Elm St., near Fourteenth St.; cost, $5,000.

H. Weisgesher, three-st'y brick building, 91 York St.; cost, $4,000.

Ten permits for repairs; cost, $9,050.

Chicago.

APARTMENT-HOUSE. — Edbrooke & Burnham have prepared plans for an apartment-house for E. S. Heaton, to be built on Warren Ave., opposite Union Park. It is to be of pressed brick, stone finish, three stories, and to cost $12,000.

DWELLINGS. — L. A. Herrick is to build a three-st'y residence, pressed brick with stone finish, 30' x 70', Elizabethan style, at No. 2618 Prairie Ave., from plans by Edbrooke & Burnham; to cost $16,000.

The same architects have in hand designs for a two-st'y and cellar frame residence, 25' x 50', for G. F. Gossman, Hyde Park; to cost $5,000.

A house for Charles Nimrod is to be built on Beldon Ave., by H. F. Starbuck, architect, at a cost of $7,000.

MORGUE. — The Commissioners of Health and of Public Works are arranging to build a new morgue.

STATION-HOUSES. — The lowest bidder for the erection of three police station-houses is Geo. C. Bodmer, as follows: East Chicago Ave. station, $1,382; West Chicago Ave. station, $1,260; North Ave. and Milwaukee Ave. station, $2,498; total, $5,140.

BUILDING PERMITS. — Chicago North Division Railway Co., three-st'y and basement brick office-building, 54' x 125', s e cor. Clark and Division Sts.; cost, $25,000.

W. & E. Batchelder, change factory into flats, 25' x 65', 363 East Division St.; cost, $2,000.

Chas. Mears, additional story, 50' x 100', 227 and 229 Michigan St.; cost, $2,000.

Schlitz Brewing Co., two-st'y brick offices and barn, 40' x 96', Ohio and Union Sts.; cost, $8,000.

J. F. Groh, one st'y brick cottage, 20' x 60', 267 Rumsey St.; cost, $1,000.

New York.

STORE. — The store proposed to be built for Messrs. Park & Tilford, on Fifth Ave., between Fifty-ninth and Sixtieth Sts., it is now decided will be larger than at first intended, and will have a frontage of 50' on Fifty-ninth St.; the frontage on Fifth Ave. will be the same, and will be iron on the first st'y, and above brick, brownstone and terra-cotta. The building will cover a plot of 11,250', and the designs are being drawn by Messrs. D. & J. Jardine.

TENEMENT-HOUSES. — Seventeen double tenement-houses, brick and brownstone finish, 25' x 60' each, on Tenth Ave., Twentieth, and Twenty-first Sts.; Mr. Geo. B. Pelham, architect.

FACTORY. — A factory and stable are to be built at No. 262 West Forty-first St., for Mr. P. Maresi.

STABLE. — A large stable is to be built on the s e cor. of Fifty-first St. and Broadway, for Mr. Henry Quigley, from designs of Mr. Henry J. Dudley.

CHURCH. — For the Bethany Presbyterian Society a church of brick, terra-cotta and stone, in the Gothic style, to cost about $30,000, is to be built at Mott Haven, from designs of Mr. Jas. L. Farnsworth.

THEATRE. — Mr. Harry Miner is to build a new variety Theatre at the cor. of Christopher and Bedford Sts.

TENNIS-COURTS. — At No. 18 East One Hundred and Thirtieth Sts., for the Mount Morris Apartment-House Association, the building now standing is to be altered and additions made, to be utilized for bowling-alleys and tennis-courts; Mr. Wm. B. Tuthill is the architect.

BUILDING PERMITS. — *Ave. A*, s w cor. Ninetieth St., five-st'y brick school-house, tin roof; cost, $45,000; owners, Board of Managers of the St. Joseph Orphan Asylum, Joseph Helmprecht, President, 173 East Third St.; architect, A. H. Blankenstein; builder, not selected.

Twenty-first St., s s, 300' w Tenth Ave., 2 four-st'y brick tenements, tin roofs; cost, each, $12,000; owner, Clinton Sutphen, 20 Nassau St.; architect, Geo. B. Pelham.

Second Ave., n w cor. Seventy-first St., five-st'y brick tenement and store, tin roof; cost, $17,000; owner, Mary M. Kircheis, 508 East Eighty-ninth St.; architect, W. Jose.

Second Ave., w s, 26' n Seventy-first St., 3 five-st'y brick tenements and stores, tin roofs; cost, each, $11,000; owner and architect, same as last.

Ave. B, No. 258, five-st'y brick tenement and stores, tin roof; cost, $14,000; owner, Mrs. Matilde C. Jantzen, 301 Sixth St.; architect, John M. Forster.

Seventy-eighth St., n s, 275' w First Ave., 4 four-st'y brick, brownstone front tenements, tin roofs; cost, each, $15,000; owner, Jacob L. Maschke, 192 Division St.; architect, J. C. Burne.

Courtland Ave., w s, 30' s One Hundred and Fifty-second St., three-st'y frame dwell., tin roof; cost, $2,500; owner, R. A. Sanginetti, 377 North Third Ave.; architects, Kerby & Archer.

South Fifth Ave., *No.* 61, five-st'y brick tenement, tin roof; cost, $18,000; owners, R. & A. Thomas, trusts, 3 Mercer St.; builders, Berger & Baylies.

East Seventeenth St., No. 428, five-st'y brick tenement, tin roof; cost, $15,000; owner, John Kehoe, 522 East Eighteenth St.; architect, F. W. Klemt; builders, S. Niewenhaus and Chas. Lehmann.

One Hundred and Forty-fourth St., n s, 570' e Willis Ave., two-st'y frame dwell., tin roof; cost, $3,500; owner, Jas. S. Bryant, 715 East One Hundred and Forty-fourth St.; architect, H. S. Baker.

Fourth Ave., n e cor. Fifty-eighth St., three-st'y brick stable, gravel roof; cost, $10,000; lessee, James A. Flack, 425 East Fifty-seventh St.; architect, A. B. Ogden.

East Forty-fifth St., No. 240, one-st'y and basement synagogue, tin roof; cost, $12,000; owners, the Societé Communante, Israelite Francaise, Samuel Ulmar, President, s w cor. Ave. B and Fourth St.; architect, Wm. Graul.

Sixty-first St., n s, 200' e Tenth Ave., five-st'y brownstone front flat, tin roof; cost, $24,000; owner, Margaret Corrigan, 884 Tenth Ave.; architect, C. F. Ridder, Jr.

Courtland Ave., w s, 22' n One Hundred and Fifty-eighth St., three-st'y frame tenement, tin roof; cost, $1,500; owner, Geo. W. Siemon, 634 Ninth Ave.; architect, C. F. Ridder, Jr.

Forty-eighth St., s s, 100' e Tenth Ave., 5 five-st'y brownstone front tenements, tin roofs; cost, each, $13,000; owner, John Livingston, 981 Lexington Ave.

Eightieth St., s s, 250' w Third Ave., five-st'y brownstone front flat, tin roof; cost, $18,500; owner, August Schwarzler, 401 West Forty-first St.; architect, John Brandt.

Philadelphia.

PLUMBING ORDINANCE. — The plumbers and architects have united to secure proper sanitary plumbing. At the meeting of a special committee, the Chief Engineer submitted an ordinance he had prepared, which contained a series of rules to secure good material and workmanship, and other important matter relating to how the purpose desired could be accomplished.

BUILDING PERMITS. — *Alder St.*, s of Girard Ave., three-st'y dwell., 16' x 30'; N. S. Brown, owner.

Federal St., No. 1635, front alterations and two-st'y building, 12' x 30'; L. J. Lynch, owner.

Chestnut St., Nos. 920 *and* 922, front and interior alterations; J. H. Errickson, contractor.

Gaskill St., No. 205, three-st'y dwell., 19' x 23'; Mrs. J. McMullen, owner.

Janney St., cor. Venango St., two-st'y dwell., 16' x 18'; Taylor Brown, owner.

Berks St., s w cor. Twenty-third St., church-building, 56' x 176'; cost, about $40,000; E. F. Durang, architect.

Chestnut St., Nos. 1307 *and* 1309, two interior alterations; Jno. Wanamaker, owner.

Manayunk Ave., s s, e of Cedar St., three-st'y dwell., 18' x 47'; Jas. H. Boone, owner.

Ward St., e s, s of Wharton St., two-st'y dwell., 16' x 38'; M. Kennedy.

Warner St., n w cor. Ezekiel St., two-st'y stable, 25' x 25'; M. L. Shur, owner.

Sixth St., e s, and n of Indiana Ave., 6 two-st'y dwells., 14' x 43'; J. S. Kelly, owner.

North Fifth St., No. 1823, two-st'y shop, 20' x 50'; H. M. Martin, contractor.

Nineteenth St., e s, e of Wharton St., 2 dwells., 17' x 65'; Thos. Marshall.

Ward St., e s, e of Wharton St., dwell., 16' x 28'; L. P. Simpson.

Moore St., s s, between Fourth and Fifth Sts., 8 three-st'y dwells., 16' x 45'; A. M. Green, owner.

Eustis St., n s, between Fourth and Fifth Sts., 2 two-st'y dwells., 15' x 30'; A. M. Green, owner.

Reed St., e s, n s cor. Garrett St., between Eighteenth and Nineteenth Sts., 4 two-st'y dwells., 16' x 42'; Wm. Stuckey, contractor.

Third St., e s, s of Buttonwood St., two-st'y brewery, 18' x 20'; Chas. Beltenmiller, contractor.

St. Louis.

BUILDING PERMITS. — Thirty-seven permits have been issued since our last report, of which sixteen are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Henry Gauss & Son, addition to four-st'y planing-mill; cost, $4,500; contract sub-let.

Lo. Moser, four-st'y hotel; cost, $50,000; McElpatrick & Son, architects; contract sub-let.

Duncan Parker Hardware Co., two-st'y iron-clad; cost, $8,000; contract sub-let.

Jacob Mertz, two-st'y brick dwell.; cost, $3,200; Wm. Gahl, contractor.

Thos. Flannery, two-st'y brick dwell.; cost, $4,500; Jos. Flannery, contractor.

Fehlig Bros., two-st'y brick box factory; cost, $3,000; Baber & Co., contractors.

Henry Stussel, two-st'y brick dwell.; cost, $5,000; Louis Yaeger, contractor.

W. Patterson, 2 two-st'y brick dwells.; cost, $10,000; Thos. Gugerty, contractor.

PROPOSALS.

STEAM PROPELLER FOR THE QUARTERMASTER'S DEPARTMENT.

[At New York, N. Y.]

DEPOT QUARTERMASTER'S OFFICE,
CORNER HOUSTON AND GREENE STS.,
NEW YORK CITY, February 5, 1883.

Sealed proposals, in triplicate, with a copy of this advertisement attached to each, are invited, and will be received at this office **until 12 M., March 7, 1883**, at which time they will be opened in the presence of bidders, for the construction of a steam propeller for the United States Quartermaster's Department, for service at Fort Monroe, Virginia. Bids are invited to be made for the vessel complete; also for that portion embraced in specifications No. 1, or that in No. 2, or that in No. 3, only, or those portions in any two of them. Plans and specifications of the same, together with all other necessary information, will be furnished to bidders, on application to the Chief Quartermaster on Governor's Island, New York Harbor, the Depot Quartermasters at Washington, Baltimore, Philadelphia, and Boston, the Post Quartermaster at Fort Monroe, Virginia, and at this office. Bids are also invited for the work on the basis of supplying out-board condenser, 6-inch, No. 8 copper, or ¼ brass. Also on the basis of the Government supplying the circulating and air pump, and a condenser of one-half the required capacity, the contractor furnishing the other half and making all connections. In either case, if award is made thereon, the specifications will be changed accordingly. The right is reserved, on the part of the United States, to reject any or all bids. Proposals should be indorsed "Proposals for Construction of Steam Propeller," and addressed to the undersigned. HENRY C. HODGES,
Deputy Quartermaster-General, United States Army.

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COURT-HOUSE.

[At Caledonia, Minn.]

Sealed proposals will be received by the building committee of the County Commissioners of Houston County, Minnesota, **until March 21, 1883**, at the office of the Auditor, in Caledonia, for the construction of a stone court-house for said county, according to plans and specifications of same now on file at the Auditor's office, and at the office of the architects, C. G. Maybury & Son, Winona, Minn., who will give any further information desired.

No bids will be received except for the whole building complete as specified.

The successful bidder will be required to give bonds in the sum of $5,000.

The right to reject any and all bids is reserved.

By order of Building Committee.

372 E. K. BOYERUD, County Auditor.

PROPOSALS.

SCHOOL-HOUSE. [At Brattleboro, Vt.]

BRATTLEBORO, Vt., January 19, 1883.

The plans and specifications of a two-st'y brick school-house, 96'x 124', will be open for inspection after January 30, at the office of Haskins & Stoddard, Brattleboro, Vt. Bids for constructing the same in a thorough and substantial manner will be received by the undersigned up to **12 M., February 20, 1883.** Bids may be made for building the house as a whole, or in parts, to wit: For the basement or foundation story, with necessary excavations; for the mason-work, for carpenter-work and painting; for heating and plumbing. The successful contractor will be required to give sufficient bonds to insure a faithful compliance with their contract. The committee reserve the right to reject any or all bids as they may deem best for the interest of the district.

H. D. HOLTON,
WM. H. COLLINS,
E. W. STODDARD,
JACOB ESTEY,
GEO. A. HINES.
} Building Committee.

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IRON FURRING AND LATHING, ALSO FIRE-PROOF COVERING FOR IRON COLUMNS. [At Topeka, Kans.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., February 1, 1883.

Sealed proposals will be received at this office **until 12 M., on the 24th day of February, 1883,** for furnishing and fixing in place, complete, all the iron furring and lathing, also the fire-proof covering for the iron columns, required for the Court-House and Post-Office at Topeka, Kansas, in accordance with drawings and specifications, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL,
372 Supervising Architect.

MOVABLE DAM. [At Louisville, Ky.]

U. S. ENGINEER OFFICE, 82 WEST THIRD ST.,
CINCINNATI, O., January 12, 1883.

Sealed proposals in duplicate will be received at this office, **until 12 o'clock, noon, on Thursday, the 1st day of March, 1883,** for the construction of the parts necessary for 200 feet of movable dam, and the delivery of the same at Louisville, Ky.

Approximate quantities: Wrought-iron, 28,000 pounds; cast-iron, 2,500 pounds; malleable-iron, 850 pounds; dressed white-pine, 1,200 feet, B. M.; dressed white-oak, 400 feet, B. M.

Specifications and all necessary information can be obtained by application to the undersigned.

WM. E. MERRILL,
374 Major of Engineers.

COUNTY COURT-HOUSE. [At Mount Ayr, Io.]

Drawings can be seen after February 10th at the office of the County Auditor, at Mt. Ayr, Ringgold Co., Iowa, or at the office of Eckel & Mann, architects, St. Joseph, Mo.

Sealed bids must be in by **March 1, 1883.**

The Supervisors reserve the right to reject any or all bids.

By order of the Board.

T. A. STEVENSON, Chairman.
J. E. DOZE, County Auditor. 373

MASONRY AND GRADING. [Near Blackstone, Mass.]

NEW YORK & NEW ENGLAND RAILROAD CO.
ENGINEER'S OFFICE,
224 FEDERAL ST., Boston, February 3, 1883.

Sealed proposals will be received at this office **until Thursday, February 15,** for doing the grading and building the masonry necessary for a second track between Blackstone, Mass., and the east switch at Andover, Ct., 58 3-10 miles; for further information apply at this office.

L. B. BIDWELL,
372 Chief Engineer.

DAM. [At Louisville, Ky.]

U. S. ENGINEER OFFICE, 82 WEST THIRD ST.,
CINCINNATI, O., January 12, 1883.

Sealed proposals, in duplicate, will be received at this office **until 12 o'clock, noon, on Thursday, the 1st day of March, 1883,** for the construction of the parts necessary for 200 ft. of movable dam, and the delivery of the same at Louisville, Ky.

Approximate quantities: wrought-iron, 28,000 lbs.; cast-iron, 2,500 lbs.; malleable iron, 850 lbs.; dressed white-pine, 1,260 feet B. M.; dressed white-oak, 400 feet, B. M.

Specifications and all necessary information can be obtained by application to the undersigned.

374 WM. E. MERRILL, Maj. of Engineers.

COURT-HOUSE. [At Caledonia, Minn.]

Sealed proposals will be received by the Building Committee of the County Commissioners of Houston County, Minnesota, **until March 21, 1883,** at the office of the Auditor in Caledonia, for the construction of a stone Court-House for said County, according to plans and specifications of same now on file at the Auditor's Office, and at the office of the architects, C. G. Maybury & Son, Winona, Minn., who will give any further information desired. No bids will be received except for the whole building complete as specified. The successful bidder will be required to give bonds in the sum of $5,000. The right to reject any and all bids is reserved, By order of Building Committee.

376 E. K. BOVERUD, County Auditor.

WATER-WORKS. [At Gloucester, N. J.]

GLOUCESTER CITY, January 27, 1883.

Sealed proposals in writing will be received by "The Mayor and Common Council of Gloucester City, New Jersey," at their usual place of meeting at the City Hall in said City, **up to 8 o'clock of the evening of February 13, 1883,** for furnishing material and labor for constructing a water-works for said city under and by virtue of an act entitled "An act to enable cities to supply the inhabitants thereof with pure and wholesome water," approved April 21st, 1876, and the supplement thereto approved March 9th, 1877, and also under and by virtue of an ordinance entitled "An ordinance for the construction of Water-Works for Gloucester City, for the appointment of a civil engineer to superintend the construction thereof, and for the issuing of bonds for the payment of the same." Passed by Common Council of Gloucester City, August 3, 1882.

Bids for the pipe system complete to state the price per foot for furnishing all material, pipes, hydrants, stops, etc., and laying same. Each bidder must accompany his bid with a certificate that he has deposited three hundred ($300) dollars with the City Treasurer. The sum thus deposited to be forfeited to the city should the successful bidder refuse or neglect to enter into contract within ten (10) days from the time of such contract being awarded to him. The money to be returned to the unsuccessful bidder as soon as the contract is awarded. The successful bidder will be required to give satisfactory security for the faithful performance of his contract in the sum of fifty (50) per cent of the value of his contract, with at least two sureties to be approved by the Mayor and Common Council of Gloucester City, New Jersey.

Plans and specifications may be seen at the Mayor's office in Gloucester City, or at the office of the engineer, 144 South Fourth St., Philadelphia, Pa. The Mayor and Common Council of Gloucester City, New Jersey, reserve the right of rejecting any and all bids.

WILLIAM R. TAYLOR, Recorder,
ROBERT CONWAY, Pres. of Common Council.
372

HARDWARE. [At Philadelphia, Pa.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., February 5, 1883.

Sealed proposals will be received at this office **until 12 M., on the 26th day of February, 1883,** for furnishing and delivering at the Treasury Building, Washington, D. C., all the hardware required for the Court-House and Post-Office at Philadelphia, Pa., in accordance with specification and schedule, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL,
373 Supervising Architect.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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FEBRUARY 17, 1883.

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THE report of the New York Inspector of Buildings for 1882 gives ample evidence of the perseverance and energy with which that officer has carried out his difficult duty during the past twelve months. Notwithstanding the small number of inspectors attached to the Bureau, Mr. Esterbrook has been able, besides keeping a strict and reasonably thorough watch over new structures, to investigate the condition of a great number of old buildings, and compel their owners to improve such as were found unsafe. The burning of the Potter Building and the Park Theatre, instead of suggesting to the Inspector, as some of the New York papers thought, the propriety of turning his attention to other buildings of the same kind, should rather be said to have, by their effect upon public opinion, strengthened his hands to carry out those reforms which he has always had in mind, but which even his determination was powerless to effect without such support, and during the year no less than thirteen hundred and seventy-three buildings were in one way or another made safe, by peremptory orders from the department, and two hundred and five were taken down altogether. This is a far greater number than ever before, and we venture to say that however strict the inspection of new buildings in other cities may be, there is no place of the same population as New York where four buildings a day are entered by the officials of the city, and the owners compelled, without appeal, or even delay, to pull down partitions, build balconies, cut out floors, and construct stairs and fire-escapes, to the satisfaction of a man who regards it as his duty to care for the safety of innocent persons at any cost to those to whom that safety is committed; nor are there many towns where four buildings a week are torn down altogether to satisfy the same watchful care. It is needless to say that such proceedings as these rouse the indignation of the persons affected far more than any restrictions upon the construction of new buildings, and the struggle against the remonstrances, to say nothing of the appeals for consideration, of two or three thousand property-owners and tenants in a single year, may well tax the firmness of the Inspector to the utmost. There are few officers who would have the strength of mind to sustain such a trial long, and the people of New York who are not interested in tumble-down tenements would do well, if they desire to retain the services of one of such exceptional character, to sustain him by all the moral support and sympathy that they can give him.

A RATHER important case has been decided in Chicago, which concerns architects and builders perhaps as much as the parties directly involved. It seems that some years ago a house stood on a certain lot in that city, supplied with gas from a service-pipe from the main in the street. The house was pulled down, to make room for the erection of another on the same site, and the old service-pipe was capped, and left projecting slightly through the wall, another service-pipe being put in to supply the new house. By the arrangement of the new house a coal-bin was planned at the point where the old service-pipe came through the wall, and while the bin was being filled, not long ago, a lump of coal struck the stump of the pipe and broke it off, allowing a great quantity of gas to escape into the cellar, where it exploded, severely injuring the mistress of the house, who brought an action for damages against the gas-company. The company defended itself on the ground that all service-pipes belonged to its customers, instead of itself, and that its customers were alone accountable for injury to their property. This was the real point of the trial, the question as to the actual author of the injury not being called up at all. The suit was brought for fifty thousand dollars, as damages, and the jury awarded nine thousand, being apparently satisfied that the responsibility for the service-pipes lay in the company. It is so common to see, particularly in city buildings, the ends of abandoned gas and water pipes projecting through the cellar-walls, where they are liable to be broken at any time by settlements or accident, that the question of responsibility for their care, and for damage which may result from any injury to them, is a matter of considerable importance.

THE Broadway underground railroad scheme, after remaining quiescent for a long time, has apparently been revived, and a renewed discussion is going on as to the probability of its construction being injurious to the buildings along the line of its route. As at present contemplated the excavation for the tunnel will be fifteen feet deep, and twenty-one feet wide, and the owners of buildings on the lower part of Broadway, where the ground is soft and sandy, claim that there would be great danger that the soil beneath their buildings might escape into the tunnel excavation, allowing the foundations to sink. There is certainly great reason for these fears, and although the danger may be averted by care, and the use of precautions well known to engineers, ample assurance ought to be given that these will be employed. According to the testimony of one witness before the Commission which is inquiring into the matter, no surveys have been made, and no steps taken toward inquiring into the possibility of constructing such a road. If this is so, it would look as if the purpose of forming the company were more to sell bonds and stock than to build the tunnel, and the public would do well to inquire, if such securities should be put upon the market, whether they represented a carefully planned and practicable enterprise, or a mere broker's plot for extracting money from the pockets of the unwary, under cover of plausible representations, to enrich those who would take good care to shift their responsibility upon other shoulders before the time came to carry the scheme through to actual success.

THE steam-pipes in the streets of New York continue to give trouble in various ways. A week or two ago, by some operations of the workmen, a gas-pipe was broken, and the gas allowed to escape into the trenches, where it accumulated until an inspector, entering a man-hole with a lantern, ignited it, when the whole exploded with great violence, scattering earth and paving-stones in all directions. The American Heat and Power Company seems to be the object of more animadversion than its rival, and the packing around its pipes is said to give out unpleasant odors, which penetrate into the neighboring cellars, and even cause annoyance in the streets. A workman employed by the company is said to have been overcome by the stench in one of the man-holes, so that he was drawn out insensible by persons who happened to be passing, and several merchants have complained that their clerks and their customers were made ill by the effluvium. In consequence of the continued difficulties with which the enterprise seems to be beset, Mr. Buel, the engineer to the American Company, has resigned his position, and Mr. Frederic Tudor, a well-known and very highly-trained expert, has been appointed in his stead. Under Mr. Tudor's administration the pipes are to be again inspected, and modifications made in the grading, as well, perhaps, as in other details of the work.

A QUESTION is asked in *La Semaine des Constructeurs* which is not unfrequently heard in this country, and the French opinion on the subject is of interest to all architects. It seems that a proprietor invited estimates from a num

ber of contractors for the execution of a monument, after plans and specifications prepared by his architect. The work was not carried out; and one of the contractors sent to the proprietor a demand for payment for his trouble in making the estimate. The correspondent inquires whether he is entitled to receive such payment. To this the editor of *La Semaine* replies, that the fact of the submission of plans by a proprietor to a contractor, and an inquiry as to the sum for which he will carry them into execution, does not legally imply any engagement of that proprietor with the contractor. The process is simply an ordinary consequence of the custom of competitive bidding. The contractor knows the risk, as well as the advantage, of responding to the invitation to submit an estimate, and he is free to do so or not as he chooses. If he chooses to make a tender, he can only do so intelligently by studying the plans, and this he does for the sake of making the offer, and not as a favor to the proprietor.

ANOTHER question of some importance is also answered in *La Semaine des Constructeurs*. It appears that a certain church was in process of construction or repair, under the direction of an architect, who had made proper calculations, and had taken the necessary means, for insuring the stability of the edifice after its completion. During the progress of the work certain centres, placed to support the arches temporarily, failed, and the building was injured. The point to be determined is, whether the architect or the builder should be held responsible for the accident. The reply to this is, that as a general principle the contractor is alone responsible for defects in execution, and the architect for vices in the design. The contractor is supposed to know, better than the architect, the order in which the several portions of a construction should be carried out; he is expected to understand the modes of preventing injury or failure in *unfinished* work; he is constantly present, in person or by deputy, to direct the operations in progress, and is relied upon to watch effects and supply remedies. The architect, on the contrary, so far as regards his plans, is concerned only with the finished work, and if that is designed in accordance with the laws of stable equilibrium, his duty in relation to the plans is fulfilled. If, being present at the work, he should give wrong directions, he would have at least a share of the responsibility to bear, but in his absence the contractor is certainly bound to pursue his operations in accordance with the rules of his own art. For these reasons *La Semaine* decides that the contractor alone should be held responsible for the damage caused by the insufficient centering or other temporary support which caused the fall of the arch.

A NEW and ingenious indicator, for showing at any distance the height of water or other liquids in a reservoir, has been invented by M. Decoudun. The action of the indicator depends upon the fact that a small body of air retained at the bottom of a reservoir will be acted upon by the hydrostatic pressure of the liquid in the reservoir, which will depend upon the height of the liquid above the body of air. The submerged portion of the indicator consists of a small cast-iron bell, the interior of which communicates with a tube, which can be carried to any distance, and may be connected with any number of manometers. The tube being entirely closed, any variation of pressure in it, or in the bell with which it is connected, is immediately shown on the manometer tube or dial, and by graduating this suitably, the number of feet or inches of water above the mouth of the submerged bell may be read directly. Such an apparatus as this is likely to be of great use for many purposes. The large tanks placed on the top of buildings for supplying elevators or plumbing apparatus are seldom very accessible, and it is often difficult to bring either a tell-tale pipe or a weight, moved by a float, down to the engine-room or other place within sight of the person who is responsible for its proper condition. In such cases an indicator of this kind, with dials in various places, connected perhaps, with alarm-bells, as might easily be arranged, would avert many serious accidents.

LE GENIE CIVILE gives a description, with illustrations, of the new Eden Theatre, which has been the talk of Paris for some time. The building is a large one, the stage being as deep as that of the Grand Opera itself, while the auditorium has the dimensions of a first-class theatre. The arrangement, however, is a very peculiar one. The ground floor is that of any theatre, comprising a pit for the orchestra, and rows of parquet seats, with a circle of private boxes at the back, and two proscenium boxes on each side. Above this is a balcony with five rows of seats, which is approached, not from an enclosed passage, as usual, but from a wide corridor, separated on one side by an open arcade from the auditorium, and on the other from a great conservatory, or winter garden. By this disposition, the patrons of the house are enabled at pleasure to leave their seats and promenade around the corridor, enjoying a full view of the performance in progress on the stage while inhaling the fresh fragrance of the flowers in the conservatory. This latter apartment is directly accessible only from one end of the corridor, and serves, in connection with a gaily decorated apartment opening from the other end of the corridor, as a refreshment-room. The whole interior is designed in what is supposed to be the Indian style, the form of the columns which carry the arcade being suggestive of those in the rock-cut temples of Elephanta, while arches of many cusps and reversed curves suffice to heighten an impression of which the pagoda-like towers of the entrance front give the key-note. The construction is mainly of iron and brick, with decorations in stamped and painted plaster. All the staircases are of iron or stone. The winter-garden and the restaurant are lighted with electric lamps and the theatre proper with gas.

TWO novel cases of short-circuiting of electric-light wires are reported, each of which contains a warning which it may be well to remember. A few weeks ago a wire of the Baxter Electric-Light Company in Jersey City came in contact with a telephone wire, extinguishing the lights supplied through the larger wire, and destroying two telephone instruments, besides injuring the switch-boards in the Telephone Exchange room. On examination the two wires were found to have been tied together with an old woollen scarf, and following this indication a man was arrested the next day for a malicious attempt to do injury by bringing them purposely into contact. In the second case, the arc-lights used for illuminating a large store suddenly failed without any apparent cause, and it was not until after a search that a rat was found, standing on one of the conductors, and with a paw outstretched toward the other. The animal must have jumped first upon the lower conductor, and in attempting to climb to the upper one received the whole current of the dynamo-machine, supplying forty lights, which not only instantly killed him, but stiffened him in the attitude in which he received the fatal shock, so that his body continued to act as a conductor until it was found and removed.

AN important statement is quoted by *Le Génie Civil* from a discussion in the Société des Ingénieurs Civils in relation to the International Exposition which is to take place this year at Amsterdam. According to the speaker who called attention to the question, there is no patent law in Holland, that which once existed having been abrogated twelve or thirteen years ago; and, what is still more serious, there is no treaty, law or other regulation by which the rights of foreign inventors who show their manufactures at exhibitions in the country are protected from the attempts of those who care to invade them. In view of these circumstances, the speaker sought the opinion of the society upon the question whether it was advisable to warn all French manufacturers and inventors against sending their works, or the products of their industry, to Amsterdam, or whether an attempt should not first be made to secure from the Dutch Government such a recognition of the rights of exhibitors as all other civilized countries gladly give them. Among us, the idea of sending our manufactures abroad has lost most of its charm, and there are some American inventors who will long regret the day that they were persuaded to exhibit their goods at Vienna and Paris; and if such governments as those of France and Austria cannot efficiently protect their guests against piracy, it is hardly likely that the invitation of a country where industrial free-booting appears to be licensed will meet with a hearty response here. In fact, American manufacturers find it more profitable for them to exhibit their goods in their own country, rather than abroad. Their reputation for ingenuity is so well established that foreign buyers are sure to be willing to take the trouble to come and see for themselves the objects which are not likely to be sent to them, and unless in the case of complete novelties, like the telephone or the sewing-machine, there is too much difficulty in selling American articles abroad at a profit to make it worth while to take extraordinary pains for creating a market.

WATER-CLOSETS. — IV.

THE subject of water-closets that were in use before the year 1800 was reviewed by the author in a paper read before the Sixteenth Annual Convention of the American Institute of Architects. In the following articles I will treat of the forms or patterns that have been used between 1800 and the present time, covering a period which has been remarkably prolific in mechanical inventions and contrivances.

It would be neither useful nor profitable to describe all the inventions for which patents have been issued on this device; but those will receive due attention that have either merit in themselves, or have merits or demerits that in the opinion of the author bear upon the many patterns of closets now in use.

Classification. — Water-closets may be divided into the classes in which they naturally fall. This mode of classification was first used by Mr. T. M. Clark, in his articles on "Modern Plumbing," published several years ago. The "valve-closets" include all that have a valve whose points of contact with the bowl or additions thereto form a water-tight joint. The valve keeps a certain quantity of water in the bowl.

"Pan-closets" include all that have a dish-shaped basin or pan at the bottom of the bowl. The pan forms a water-seal with the bowl or a projection therefrom.

"Plunger-closets" include all that have a plug or plunger fitting over or into the entrance of the trap or soil-pipe; by this means any required amount of water is kept in the bowl.

Among "hopper-closets" I include all that have a simple bowl and no mechanical contrivances other than a water-seal to keep the sewer-air of the soil, drain or sewer pipes from entering the house.

Under the head of "latrines" are classed all rows of closet-bowls which are in reality one receptacle, having one outlet or junction with the soil-pipe, and a trap, plunger or valve common to them all.

There are a small number of water-closets that will deserve notice, which cannot be properly placed under either of the above classes.

Among the early inventions, by far the greater number were for valve-closets. It is probable that hopper and pan closets were in use before the invention of valve-closets, while there is positive evidence of the plunger-closet being in existence and use before the invention of either the Cummings or Bramah closets.

Valve-Closets. — Valve-closets may be treated of under the head of sliding and hinged valves, the latter being by far the most useful and numerous type of this class.

It is sometimes difficult to decide, when the pan is intended to fit tightly against the receiver, whether a closet belongs properly to the valve or the pan class; so under this head I describe only those that have valves properly so-called. The object of this valve is to intercept any sewer-air or organic germs that may come from the traps, soil, drain or sewer pipes, and at the same time to keep the bowl filled with a certain amount of water, about half-filled in most cases. The large volume of water deodorizes the fæcal matter discharged into it, and at the same time it prevents the bowl from becoming soiled.

In connection with these closets we always find a compartment between the bowl and soil-pipe, in which the valve either slides or works on its hinge or spindle. This closet must of necessity have an overflow.

In early times these closets were supplied from a special cistern placed over and above the closet; now they are supplied either from the main supply or from special cisterns. The water-supply is generally turned on into the bowl, and at the same time the valve of the closet is opened by one and the same lever. The largest number of patents are issued for novelty in the manner of combining these cranks, wires and levers with the hand-pull; in some cases the inventions are only remarkable for the complication of their mechanism, the inventors forgetting that the foundation of their usefulness is simplicity.

Sliding-Valves. — The sliding-valve closets have the first closet patented in Great Britain in their class. (See *American Architect*, December 23, 1882.)

Lucknow's Closet. — The only patent issued for a valve similar to the Cummings valve was issued to John Lucknow in the year 1854 by Great Britain. This closet has a sliding-valve, with a circular hole of the same diameter as the soil-pipe in one end. When the valve has been drawn back as far as possible, the two holes coincide, and the waste matter in the bowl is precipitated into the soil-pipe. The sliding bar which operates the valve is connected with the hand-pull.

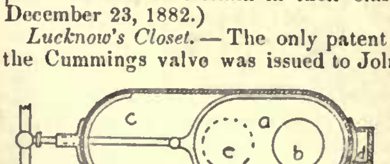


Fig. 33. — Valve and Receiver of Lucknow's Closet.

a, Slide-valve. *b*, hole in valve. *c*, Receiver. *d*, Overflow. *e*, Soil-pipe. *f*, Pull-rod connected with hand-pull.

Viney's Closet. — In the year 1824 there was a valve-closet invented in England by James Viney, that was the first of another type belonging to this class. The valve in this closet might be called a sliding gate, that slides up and down in a vertical position. The valve has grooves or guides in which it works. The bowl is kept partially full of water when the valve is closed. The compartment in which the valve works is ventilated, and the branch from the water-closet has a flap-valve where it enters the soil-pipe. The vent and overflow pipes run directly through the wall and have their ends open on the outside of the building. This closet has a minimum of space devoted to the valve-compartment, having a large body of water to flush the drains and no water-seal trap under it, so it would be an excellent closet according to Mr. Norman Shaw's ideas. A valve of this kind and apparent weight would be liable to fail from waste matter catching in the grooves, and in this manner preventing the gate taking a proper seat. In this closet I note, also, the earliest flushing-rim that extends around the bowl in an annular ring, and has an outlet so arranged as to flush and scour all parts of the bowl.

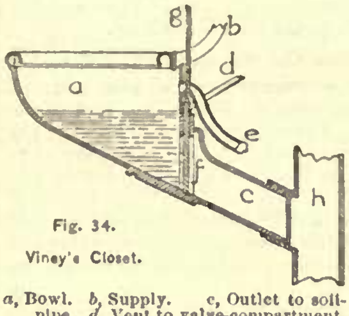


Fig. 34.

Viney's Closet.

a, Bowl. *b*, Supply. *c*, Outlet to soil-pipe. *d*, Vent to valve-compartment. *e*, Overflow. *f*, Valve. *g*, Rope or chain. *h*, Soil-pipe. *i*, Flushing-rim.

Hansom's Closet. — A patent was issued by the United States in 1882, to E. Hansom, for a sliding valve that is intended to slide across the outlet of the closet, retaining its vertical position, similar to the valve on the closet of S. N. Grubb, but sliding up and down vertically, instead of horizontally, as in the case of the latter. (See Fig. 39.)

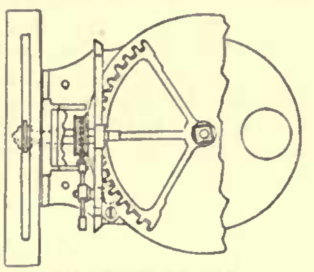


Fig. 35. — Tyler's Closet. Top view with bowl and part of valve-chamber removed.

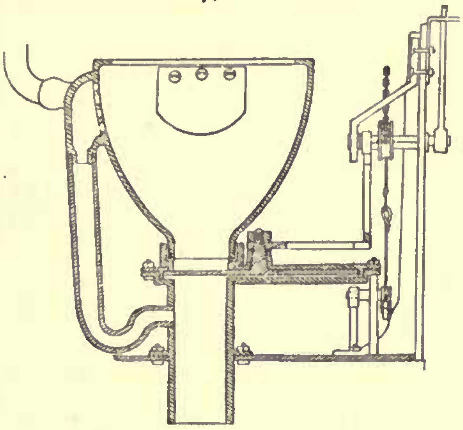


Fig. 36. — Tyler's Closet. — Section.

Tyler's Closet. — In 1829, Hayward Tyler, a Quaker, and a brass-founder of London, invented a closet with a horizontal sliding-valve that rotates on a pivot. The valve consisted of a circular disc with a hole in one side of it, which had the same diameter as the soil-pipe. When the disc is turned so that the hole in it coincides with the opening in the soil-pipe or trap, the contents of the bowl are emptied directly into the soil-pipe. Motion is imparted to this valve by a hand-lever connected to a vertical toothed quadrant, that has its axis at right angles to, and its teeth geared with, a horizontal quadrant. The axis of the horizontal quadrant is also the pivot on which the valve turns, so that any movement of the hand-lever will cause the valve to rotate on its centre. In this closet the valve-compartment is small and it does not act as a receiver for filth, the waste matter passing directly into the soil-pipe or trap; but the machinery is very complicated, and for this reason liable to get out of order and to require intelligent supervision, which is rarely expected from the householder, and never from the servants. I note three water-closets invented in the

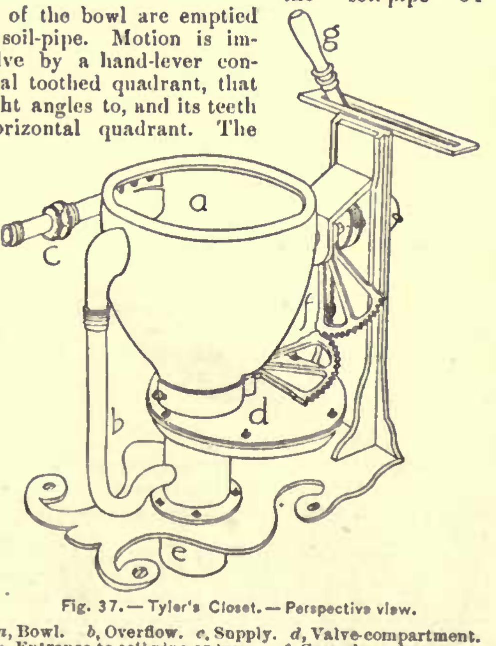


Fig. 37. — Tyler's Closet. — Perspective view.

a, Bowl. *b*, Overflow. *c*, Supply. *d*, Valve-compartment. *e*, Entrance to soil-pipe or trap. *f*, Geared quadrants. *g*, Lever.

United States, with pivoted horizontal sliding-valves: S. N. Grubb, 1879; F. Watson, 1880; J. Robertson, 1881.[1]

SEPARATE SYSTEMS OF SEWERAGE.

I have had the satisfaction of seeing the sewerage works of Lenox, Mass., Cumberland Mills, Me., and Memphis, Tenn., in which I secured the exclusion of all or nearly all of the rainfall (in Memphis complete exclusion), followed by a considerable extension of the principle of separation in American work, and, to a much greater extent, in recommendations which are not yet executed. Some of the plans recently made have followed, without change, the separate system of England, which originated more than thirty years ago, and which, in spite of certain grave defects, — defects more important here than there because of our longer droughts and heavier storms — found much favor as an improvement on the combined or storm-water system. In the American recommendations, the separate system is generally, however, blended with a storm-water system in such a way that, while some of the sewers receive only roof-water, they generally deliver into or in connection with others to which street-wash is admitted. Such a blending is sometimes advisable; but, except in cases of necessity, it should, in my judgment, be avoided. What I desire here especially to emphasize is the radical difference between the strictly separate system as carried out at Memphis and the partially separate system of England. This latter was introduced by Pilbrow at Tottenham about 1851, and has had some adherents ever since. For a long time it had very few among the better sewerage engineers. It is not a strictly *separate* system; that is, while it excludes street-wash, it admits roof-water and generally water from back-yards. This for two reasons: First, to provide for the flushing of the sewers by storm-water, which, in that country of frequent rains is, for a good part of the year, tolerably effective; and partly — and this is important — because under the English law a householder cannot be required to make two drains from his premises, nor can he be prevented from admitting roof and yard water to the drain that he does make. Neither is there any absolute restriction as to the provision he must adopt to secure the exclusion of rubbish from his yard-drain.

Therefore the "Separate System" of England is a *restricted* rather than a separate system. In order to provide, so far as practicable, for the removal of materials admitted to drains from yards, it begins usually with a diameter of nine inches, and it increases very rapidly in size up to twelve or fifteen inches of pipe and larger sizes of brick sewers.

Latterly, the system has had considerable extension in the case of towns which have been required by legal process to refrain from delivering their sewage into water-courses until purified by irrigation or other process. Compliance with the requirement is made cheaper by the restricted system than by a full storm-water system, because the amount of water to be handled in wet weather is much less than if the street-wash were added.

While in London last autumn I had conversation with several engineers who have recently constructed works of this kind. Their tone was universally to the effect that it was a system which would *do*, and would generally do very well under circumstances where it was necessary. The number of those practising it who gave me the idea that they would practise it in the absence of the legal requirements above referred to was small.

The objections to the system, which have much greater force here than they have there because of the much longer periods during which with us there is no rain, and because of our heavier rains, are as follows: —

1. Owing to the great size necessary to give to the pipes, the flushing effect of the daily maximum flow is enormously reduced, so that, even with the short intervals of drought in England, deposits in the sewers are very common, and the rain-flow is frequently only sufficient to wash together these deposits and the rubbish admitted from the court-yards, so forming actual stoppages. The need for constant watching and frequent removal of obstructions is very great, and has been cited in engineering discussions as a serious objection to the system.

2. Of course this deposition of materials between storms, if it lasts more than a day or so, becomes a source of great foulness, and the atmosphere of these sewers is worse than that of ordinary storm-water sewers. One engineer, who has always been a champion of the separate system, showed me the drainage of a large private house and grounds in London, executed under his direction and regarded by him as a model of excellence. It depended for its flushing on roof and yard-water. It had rained within a week, yet on opening some of the well-ventilated man-holes to examine the sewers, the air was found to be as foul as that of an ordinary house-drain or cesspool.

3. The system is very costly. If rain-water is to be admitted even from the smallest surface that will give a flushing quantity during moderate rains, it is necessary to give the sewers a sufficient capacity to remove *all* the water that can fall on this surface during a sudden, heavy shower, when from one to two inches in depth over the whole surface must sometimes find its way to the sewers within an hour — occasionally within much less time. If the sewers are not of ample size, sewage sets back into house-drains during such storms. It is this requirement for large diameters which makes the sewers so foul, as indicated above, and which makes them, in my judgment, quite inadmissible here, where there are often very long intervals between storms.

To give an idea of the cost of such work, I have had prepared an estimate of the sizes that would be needed for a sewer beginning twenty-five feet west of Third Avenue in New York City and discharging into a sewer in Sixth Avenue, a distance of 2985 feet, supposing it to have a fall of 1 to 200, draining every house on the way — the area being fully occupied and peopled — and receiving the rain-fall from roofs and the paved portions of yards equal to a width of fifty feet on each side of the street. The calculation assumes a rain-fall of one inch per hour, reaching the sewers at the time when they are carrying the maximum flow of house-sewage. I give an estimate of the cost of the pipes required and the cost of laying the same, *not including trenching and back-filling*, and not considering the extra cost of the wider trenches for the larger pipes, but including the cost of man-holes made necessary by the liability of such sewers to become obstructed, and offsetting these with the cost of a flush-tank at the head of a single line of six-inch sewers.

Beginning with eight-inch pipes, we should require the following lengths of different sizes: —

8-inch	393 feet, cost, including laying,	30½ cents per foot	....	$119.87
10 "	320 " " " "	46 "	....	147.20
12 "	530 " " " "	53¼ "	....	282.22
*15 "	1742 " " " "	82 "	....	1428.44
Man-holes, 9 at $40			....	360.00
				$2,337.73

If all the rain-fall were excluded and the sewer had to carry only the house-drainage, but a liberal allowance of this, the whole line might be made with six-inch pipes. Hand-holes and short lamp-holes could be substituted for man-holes, and a flush-tank at the upper end of the line would clean the whole length at least once a day. Such a sewer, with its flush-tank and all appurtenances, would not cost more than $900, excluding trenching and back-filling, as in the other case, but including royalty.

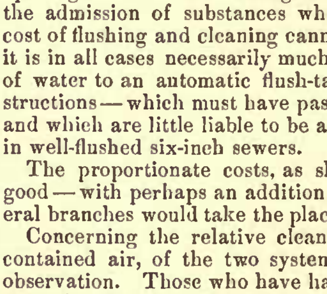
It is proper to say that wherever the English separate system is carried out, provision is made for flushing through man-holes, but this requires personal attention, which is never reliable, while the opening of man-holes leading to small pipes is a frequent source of the admission of substances which cause obstructions. The total cost of flushing and cleaning cannot be arrived at with accuracy, but it is in all cases necessarily much greater than the cost of a supply of water to an automatic flush-tank and of the rare removal of obstructions — which must have passed through four-inch house-drains and which are little liable to be arrested so as to form accumulations in well-flushed six-inch sewers.

The proportionate costs, as shown by this example, would hold good — with perhaps an addition of $100 for flush-tanks where several branches would take the place of one straight line.

Concerning the relative cleanliness and consequent condition of contained air, of the two systems, demonstration must depend on observation. Those who have had occasion to observe and to report upon the odor attending each have fully established the fact of the much greater foulness of the English system.

George E. Waring, Jr.

THE DECAY OF BUILDING STONES IN NEW YORK CITY.



On Monday evening, January 29, a lecture was delivered at the Academy of Sciences, West Thirty-first street, on the above subject, by Dr. Alexis A. Julien, who had been appointed by the Building Stone Commission of the Census Department to report on the matter. In the course of his address, as reported by the *Record and Guide*, the lecturer said: —

Stone enters into the construction, chiefly as fronts, of 11.6 per cent of all the buildings of the city. Of the entire number of stone buildings, 89.4 per cent consist of sandstone, and the several varieties of stone occur in the follow-

[1] Errata: — Page 287, Vol. XII, Note 5: For "*Hiem de l'Academy des Sciences*," etc., read: "Mem. de l'Académie," etc.

Page 300, Vol. XII, end of last paragraph but two: The date of publication for the "Compendious view of all the trades practised in London and Westminster" should be 1747.

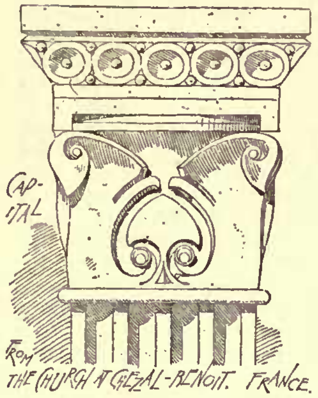
Page 30, Vol. XIII, Note 2: For "Major's *Pompeia*" read "Mazois's *Pompeia*."

* Theoretically the lower 700 feet of the sewer should be 16″ and 17″ diameter. The 15″ will work under a head below this point.

ing proportion: Brown sandstone, 78.6; Nova Scotia, 9.0; marble, 7.9; granite, 1.8; Ohio sandstone, 1.6; gneiss, 0.9; foreign sandstone, 0.1; bluestone and limestone, 0.1. The materials of general construction in the city occur in the following proportion to the total number of buildings: Brick, terra-cotta, stucco, etc., 63.2; frame (*i. e.*, partly filled in with brick), 24.3; stone, 11.6; iron, 0.9. In the business district brick predominates (77 per cent), and most of the marble and less than half of the iron buildings occur. However, the remaining iron buildings are mostly found on the large business streets in the other districts. In the residence district brick predominates (60.9 per cent), while stone is largely used (14.6 per cent). As to the durability of building stones in this district, so dangerous and rapid are the ravages of the weather that in this climate the best kind of stone cannot be said to possess any permanent qualities. The Commission appointed by the Department of the Interior to test the several specimens of marble offered for the extension of the United States Capitol, in their report of December 22, 1851, expressed their astonishment at the prevailing apathy and ignorance on this subject in these words: "Though the art of building has been practised from the earliest times, and constant demands have been made in every age for the means of determining the best materials, yet the process of ascertaining the strength and durability of stone appears to have received but little definite scientific attention, and the Commission have come to the conclusion that the processes usually employed for solving these questions are still in a very unsatisfactory state." Over thirty years have passed since these words were written, and the builders and architects employ about the same obsolete empirical methods in the trial and selection of stone, notwithstanding the abundance of new instruments and processes, and the rich discoveries concerning the structure of stone of which the last quarter-century has been prolific. In foreign countries the subject of the attacks of the atmospheric agencies on building stones has received much attention in the new light and facilities of modern science. In modern Europe, however, and particularly in Great Britain, there is scarcely a public building of recent date which will be in existence a thousand years hence. Many of the most splendid works of modern architecture are hastening to decay in what may justly be called the infancy of their existence, if compared with the age of public buildings that remain in Italy, Greece, Egypt and the East. This is largely due to the use of soft freestones and sandstones, and, especially in London, earthy, loosely-compacted limestones. In the stones of the buildings of New York and adjacent cities, the process of disintegration and destruction is widespread, and is yearly becoming more prominent and offensive. The Commissioners of the Croton Aqueduct Department, in their annual report for 1862, said: "Most of the stones in the walls of the embankment are of very inferior and perishable character, and are only kept in order by removing yearly portions of the disintegrated stone, and replacing them with durable material; but during the past year such large portions and at so many points are giving way in mass, that an increased amount will have to be expended on them during the coming season." Italian marble has been found incompetent to withstand the severity of the climate when used for out-door work, and of this good illustrations are shown in the pillars, once elegantly polished, in the portico of the church on the southeast corner of Fourth Avenue and Twentieth Street. The same objection has been urged against the out-door use of Vermont marble in our cities. As to brownstone there seems to be but one opinion—the days of brownstone fronts for the better class of houses are probably numbered. A thin veneering of soft stone, worked on to a brick wall, adds nothing to the strength of a building. It is the opinion of intelligent stone-cutters that in consequence of the exposure of these fronts to the severity of our climate, the majority of them will be in ruins and the remainder much dilapidated in a comparatively short period. In the widely-quoted opinion of an architect, "this stone is of no more use for architectural work in this region than so much gingerbread." Even the brown sandstone of the City Hall, originally of very superior quality, and the crumbling cornices, lintels, etc., of numberless houses, in some of the old streets of the city, evince decay. It makes no great difference whether the stone is laid parallel or perpendicular to its grain. In the former case its destruction is more rapid; in the latter, rottenness soon appears in the lintels, columns, cornices and other projecting portions of the edifice. Some of the fronts along Fifth Avenue, several of them less than ten years old, already look frightful to the eye of an honest stone-cutter. The Lockport limestone has been used to a small extent in this city, unfortunately for buildings of importance, since it is a loosely-compacted mass, made up of fragments of shells, corals, and the like, extremely liable to disintegration, apparently more from the action of the frost than any other cause. The Lenox Library, Fifth Avenue and Seventieth Street, constructed of this stone, betrayed decay before its completion, fragments falling out of the face of the stone from the arrises of cornices and bands. In the abundant trimmings of the same stone in the building of the Presbyterian Hospital, in the neighborhood, the surfaces are peeling off and filled with fine and deep crevices; the upright posts near the entrance archway are already seamed throughout with long cracks which betoken their speedy destruction. Other limestones, oölitic or fine granular, have been brought into use, but as yet remain untested by the condition of our climate. As to granite, its tendency to deep decomposition, termed the "*maladie du granit*" by Dolomieu, depends chiefly upon climatic conditions, which differ vastly. The obelisk of Heliopolis has stood for 3,000 years, and is still in good condition. So, too, the obelisk of Luxor had stood for 4,000 years in Egypt without being perceptibly affected by that climate; but since its transport to Paris it is reported, as the result of but forty years' exposure, that "it is now full of small cracks, and blanched, and evidently will crumble into fragments before four centuries have passed." We too, have transported another obelisk from Egypt, the "Cleopatra's Needle," and in defiance of the still greater danger incident to our severe climate, have erected it, covered with delicate carvings, upon a hillock in Central Park, exposed to our blazing sun, pelting rain and biting frost — often successively within twenty-four hours — a monument to the public ignorance in regard to the protection of even our most prized possessions, that indifference of our community to the practical value of science exemplified (through its officials) by wantonly paving the walks of Central Park with the fragments of the restoration-casts of saurians, after their laborious construction for three years by Waterhouse Hawkins. Among the agencies which cause the destruction of stone are the various chemical substances in the air, such as carbonic and nitric acid, ammonia, oxygen, in addition to mechanical agencies and variations of temperature, which in one day has fluctuated as much as seventy degrees, causing expansion and contraction of a very severe character. In this climate buildings are principally attacked from the north, northeast, and east fronts, which is shown in many buildings in this city and Brooklyn, whereas in Great Britain, the reverse is the case, the decay being affected by the side from which the wind usually comes. Among the other agencies of destruction are rain, crystallization by efflorescence, pressure, friction, organic agencies, etc. As to the durability of different stones, it depended, first, upon its chemical composition; second, on its physical structure, and third, upon the porosity of the stone, *i e.*, the degree in which the moisture permeates it. In some houses, only ten years old, flat ceilings of porticos are fast peeling away, while the action of snow and rain also wears away the stones. A study of the gravestones in Trinity Churchyard shows that a red sandstone, dated 1722, which being so exposed in the open air was tested severely, is vastly superior to any brownstone; and a bluestone, dated 1682, is still splendidly preserved, and bluestone is, no doubt, superior to red sandstone; black, gray and green stone, and an oölitic limestone are also very good for building purposes. The brownstone of Trinity Church and St. Paul's is vastly superior to that now obtained. Italian marble decays rapidly when exposed to our climate, and brownstone will be ruined by eighty years' exposure to our weather. The Brooklyn Bridge, the foundations of which are built of limestone, may rot in a few generations. As to the means for preserving building stones and saving them from decay, various processes have been attempted, but, so far, the problem has not been solved. But one thing appears clear, that mineral compounds in solution appear to be the only permanent protection to stone. Oil has been used as a coating, but it has been found that this only saves the stone for five years generally, and it has the objection that it discolors the stone, though Professor Eggleston informed the lecturer that he had used a coating of oil effectively for twenty-five years. Sir Christopher Wren, in building St. Paul's Cathedral, adopted the extraordinary method of seasoning the stones by letting them lie on the sea beach for three years before using them, which accounted for their present good state of preservation, but this process is obviously too costly to be attempted now-a-days. Mediæval architects were, indeed, content to employ the softest stones, whose fragility seems at last to have been counteracted by modern devices. Silicates and veneers of various kinds have been used, but though temporarily valuable, are of no permanent use. We have not yet discovered the true solution, though what is required is some cheap coating which shall sink into the pores of the soft stones and so form a crust which will resist the ravages of the atmosphere for centuries. When proper scientific investigation shall have been made it is probable that the very porosity of the stone, which now renders it particularly sensitive to atmospheric attack may best avail for the absorption of some cheap and durable mineral preservative, and that the present use of such stone, in its raw, crude, and unseasoned state, will be hereafter considered merely an evidence of the unintelligent and wasteful way in which we now work up our materials. Surely, since our city is placed in a region richly occupied on every side by inexhaustible supplies of sedimentary and crystalline rocks, remarkably well fitted for building construction, their surface scraped nearly bare by ice-action during the great glacial period, and thus most favorably exposed for economical exploitation, and the whole region crossed by a radial net-work of routes of transportation by water and rail, centering in this city, the natural materials for building thus offered to us should not be hastily neglected or rejected before their nature has been thoroughly understood. As to the capacity for resistance to fire of our buildings, we need only to refer to our hatchways and elevator-shafts, by which a fire starting in the basement is conveyed at once to the attic, the beams of the wooden flooring often resting upon wooden girders in the centre of the building, a very house of cards as it were, these girders, too, supported merely on slender stone piers in the basement, and on light iron pillars above, and every floor filled with a mass of combustibles, especially in the "dry goods district," and we find an accumulation of materials in false and improper conditions, whose combustion will overcome the most refractory material, and which should never be

permitted to endanger human life and property in a so-called metropolitan city. On inquiry I found among insurance men a unanimous conviction decidedly and strongly expressed *that there is not in the city of New York a single absolutely fire-proof building*—not one whose walls may not crumble before a storm of fire from without, or in which either flooring or partitions or both will not probably yield to the internal conflagration of their ordinary contents. A few edifices may approach the conditions required, but even in one of these, on the corner of Wall Street and Broadway, a recent fire on the seventh floor, fed merely by the office furniture, shrivelled up the flimsy, so-called "fireproof" partitions, and gutted the entire floor. The very material, perforated brick, which was used in these partitions, is still being hurried into new "fire-proof" buildings, now in process of construction in Fiftieth Street and elsewhere. Nevertheless, it is generally admitted that much progress and improvement have been made during the last few years, both in the choice and arrangement of building materials for the protection of our buildings from fire, and with an enlightened public opinion, much more may be expected. We have, fortunately, at our very doors, vast tracts of fire-proof material, the belt of brick-clays along the Hudson River, and the still more extensive band of clays stretching across New Jersey, excellently adapted for all varieties of bricks, terra-cotta, and tiles, to say nothing of the resources of our commerce for the importation of similar materials from the whole Atlantic coast, which we ought and must use for interior construction, as a matter of the wisest economy, and in association with which our building stones, in all their variety and enormous supply, will find their proper place. When, at least in the business districts of the city, the interior of the buildings are generally supplied with a minimum of wood, subdivided with tile, slate or concrete flooring and doors, and with sufficient partitions of brick or terra-cotta, and roofed with tiles, slate or concrete, upon fire-proof backing and supports, the nature of the stone used for the exterior will matter little, so far as concerns protection from fire, since it will not be exposed then as now to the unnatural and unnecessary furnace-test of furious flames from neighboring buildings.

THE PERMEABILITY OF WALLS AS AFFECTING VENTILATION.



FOR some time past the porosity of walls has awakened the attention of sanitary reformers, architects, and engineers. There were, it is true, Pettenkofer's most interesting experiments on this subject; but these have been, perhaps, looked upon too much in the light of interesting theories, rather than as facts to be taken into consideration in the daily work of the architect and builder. The matter, however, was brought forward more vividly by the Russians at the Paris International Exhibition of 1878. We remember calling the attention of our readers at the time to specimens of porous walls shown with the other exhibits of the St. Petersburg Pathological School. A glass case or jar was fitted hermetically upon one side of the section of a wall, and by means of a tube it was possible to blow upon the surface of the wall that had thus been covered. A similar glass jar, on the opposite side of the section, received whatever air had been blown through the wall, and this escaped by means of a second tube, which, to enable the experimenter to mark the result, was dipped in a glass of water; thus a person taking up the one tube and blowing into it could see his own breath come up in bubbles in the glass of water, after it had travelled through the wall. With a simple brick the breath passed through with the same facility and promptness as if it had been smoke drawn from a Turkish pipe. With a thick stone wall it was necessary to blow long and hard to produce an impression; but when once the current of air had been established it was easier to maintain it. Among the persons who took special notice of these facts, we may mention Dr. E. Vallin, professor of Hygiene at the Hospital du Val de Grace; Dr. Grau Overbeck de Meijer, professor of Hygiene at the University of Utrecht, and the well-known French architect, M. Emile Trélat.

During the years that have elapsed since the Exhibition of 1878, further experiments have been made and the question more fully investigated. M. Trélat sought the advice of the celebrated ventilating engineers, Messrs. Jeneste & Herscher, who, with the assistance of M. Somasco, have commenced an elaborate series of experiments. The results attained so far are, however, in contradiction to previously accepted facts. Avoiding joints, which are, it is urged, a frequent cause of error, M. Somasco found that the amount of air passing through an ordinary wall, at a pressure of 30 kilogrammes per square metre of surface, was only 120 litres per square yard. Under the normal pressure only 40 litres of air per square yard of wall would penetrate the room, and if the room were of the general size, this supply of fresh air would not represent more than two per cent of its cubic contents, per hour. Basing his arguments upon these figures, M. E. Trélat argues that the porosity of walls is of little importance so far as ventilation is concerned; but he urges that the passage of oxygen through the pores of walls may contribute to preserve the purity of the materials with which they are built. We all know how readily a wall becomes an absorber of miasma, and too often little better than a reservoir of disease. Nothing, therefore, should be done to destroy the porosity of walls bathed externally by the purer out-door atmosphere. They should, on the contrary, be allowed to absorb to the utmost the fresh air, so as to purify the materials with which they are built, if not to ventilate the rooms within. For partition-walls, however, M. E. Trélat would employ every means of rendering them air-tight. There is no advantage in allowing the more or less foul air of one room to mix with that of the next room. By such filtration from one room to the other the walls simply become "miasmatic sponges." It may tend to equalize the foulness of each room, but what advantage can there be in thus establishing this equilibrium of evil? From the outer wall fresh air is obtained, which is a distinct gain, and by facilitating evaporation we are better able to resist the effects of change of temperature. These considerations should not, however, hinder the structure of thick walls, or, better still, of double walls with a "blanket" of air between them.

If from M. E. Trélat we turn to Dr. E. Vallin, we find that this eminent hygienist refuses altogether to allow the experiments made by M. Somasco to upset the theories derived from the studies of Pettenkofer. The experiments commenced in 1853 by that celebrated German scientist show that the diffusion of air through the body of walls is far greater than what was noted by M. Somasco; but that it was modified considerably according to the direction and velocity of the wind, or the difference between the internal and external temperature. Further, rain, by clogging up with water the external pores of a wall, helped to check the passage of air. While insisting that the amount of air supplied to a room, through porosity of the walls, is much more considerable than that discerned by M. Somasco, Dr. E. Vallin would nevertheless render even the outer walls absolutely air-tight. Complaints were made that walls rendered air-tight by enamelling or other means allowed humidity to gather and run down in drops. But this humidity, produced to a great extent by respiration and the heat given off from human bodies, contains in dissolution the organic matter derived from our respiration and secretions. Absorbed by the pores of the wall, the solution evaporates and deposits the organic and putrescent matter it contains, and no experience has yet shown that this matter is destroyed in porous walls by the action of the air, as is the case with respect to well-drained soils. Thus walls, in spite of the infiltration of air, become what M. Trélat has defined as "miasmatic sponges." If, on the contrary, the sides of the walls are rendered impervious by a vitrifying wash or a silicate paint, the water, by condensing on the surface, renders the washing, or at least the wiping, of the wall a matter of absolute necessity, and thus secures the immediate removal of the organic matter, which, if left to putrefy, would so gravely endanger the health of the inhabitants. In such buildings as hospitals and barracks the observance of this principle is more especially essential, and Dr. Vallin points to the lying-in hospital known as the Pavillon Tarnier, where the mortality from puerperal fever, etc., has been so marvellously reduced by constant and careful washing of the walls with an abundant supply of water. Not satisfied with mere paint, it is now proposed to protect these walls with porcelain, with plate-glass, or sheets of zinc, which would be absolutely impermeable, thus facilitating the washing, and rendering the absorption of organic matter impossible. In one word, therefore, Dr. Vallin admits that the porosity of walls is very considerable, and urges that, as it is also very dangerous, it ought to be prevented even in the case of external walls.

In Dr. Van Overbeck de Meijer, of Utrecht, we have the exponent of yet another doctrine on this subject. Dr. Meijer has not only studied Pettenkofer's experiments, but, with some slight modifications, has repeated each one of them in his own laboratory, and confidently asserts that his own experience confirms in every respect the results previously attained by the German professor. If we allow a difference of temperature of one degree Centigrade, there passes through an ordinary wall, per hour, per square metre, 245 litres of air. By these experiments, it has also been demonstrated that no inconsiderable quantity of air forces its way through wood, especially through the joints that inevitably occur in putting wood together. Dr. Meijer does not, however, count so much on these currents as a means of local ventilation, but looks to the effect they have in reducing the dampness of confined air. When the pores of the walls are blocked by water and dust, the confined air can no longer pass out of the house, and the water, evaporated from the human beings dwelling within the house, condenses itself on the internal surface of the walls, the balustrades of the staircase, etc. Then, indeed, the house becomes scarcely habitable, and is often extremely unwholesome. One example, given by Pettenkofer, helps to confirm this argument. Some workmen's houses in Germany were built with the *scoriæ* or refuse from the neighboring iron-works. This metallic material, thoroughly air-tight, was very rough and irregular in shape. The fitting of the pieces together necessitated the use of a large quantity of plaster; and the interstices between these *scoriæ* were so numerous that the walls still retained a certain amount of porosity. Ultimately, however, a means was discovered of cutting the *scoriæ* into even shapes, so that they could be fitted tightly together: this

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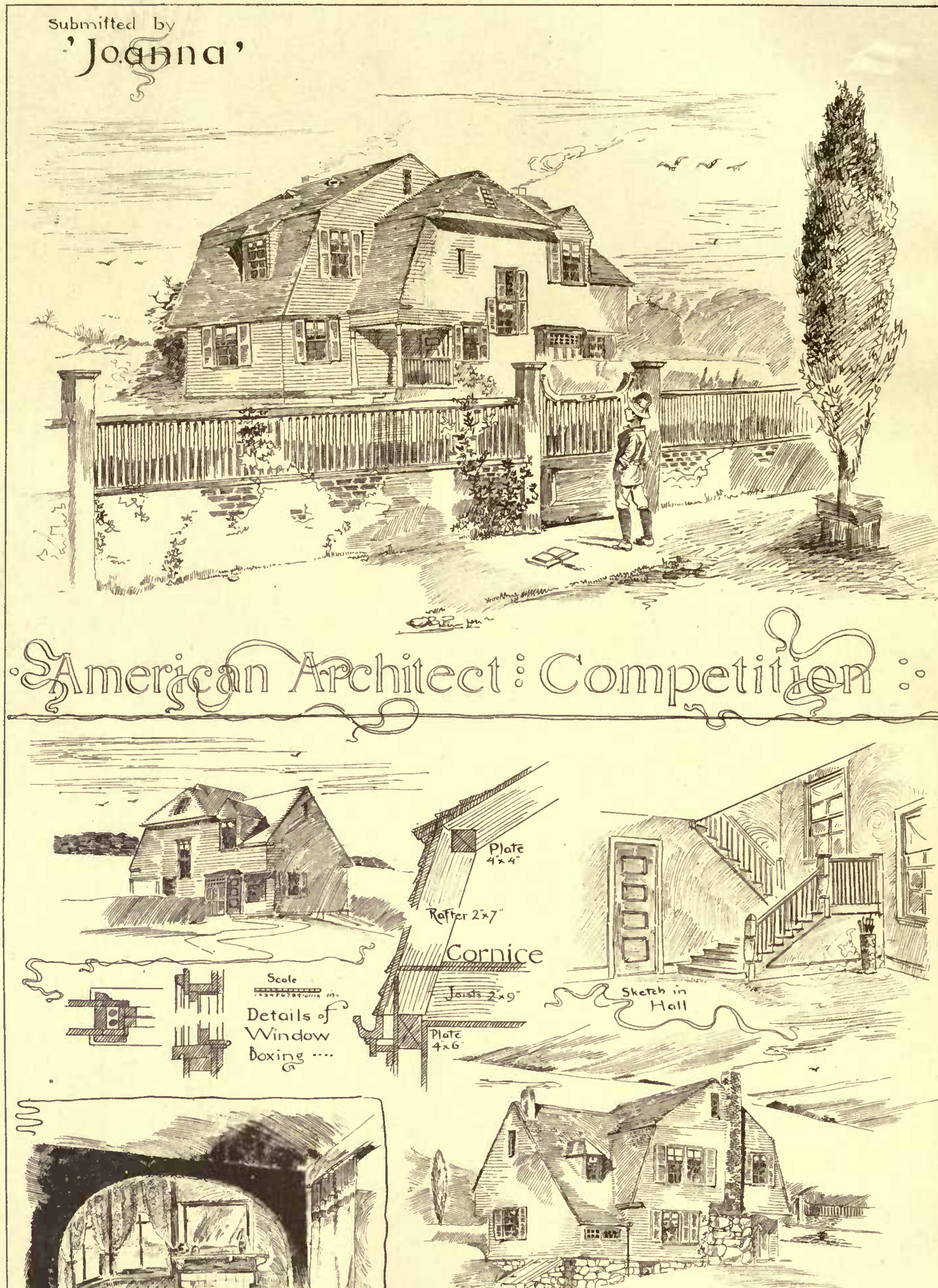

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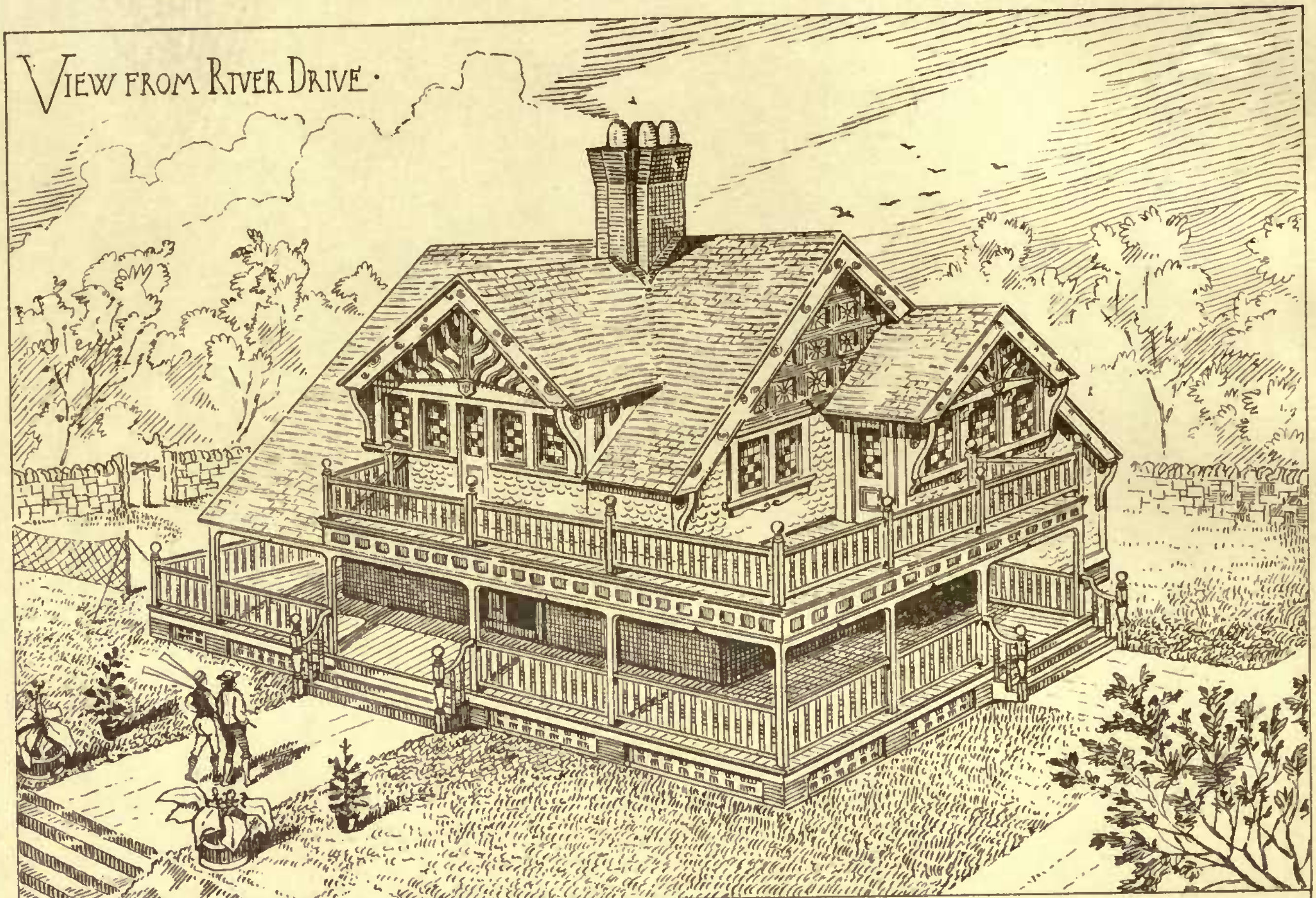

Up River Club House for the Bachelor's Barge Club of Philadelphia

Hazlehurst & Huckel, Architects.
508 Walnut St. Philada.

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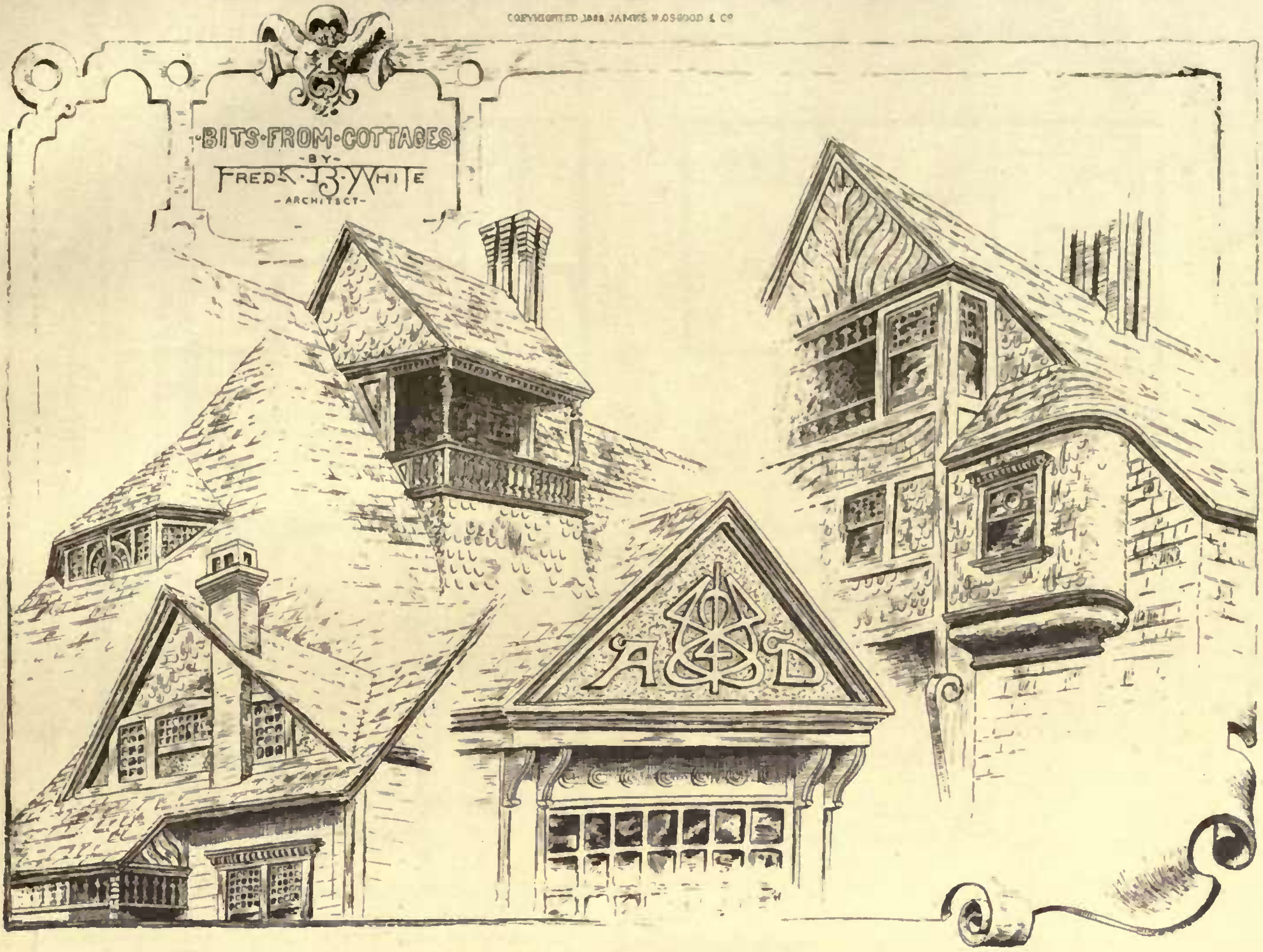

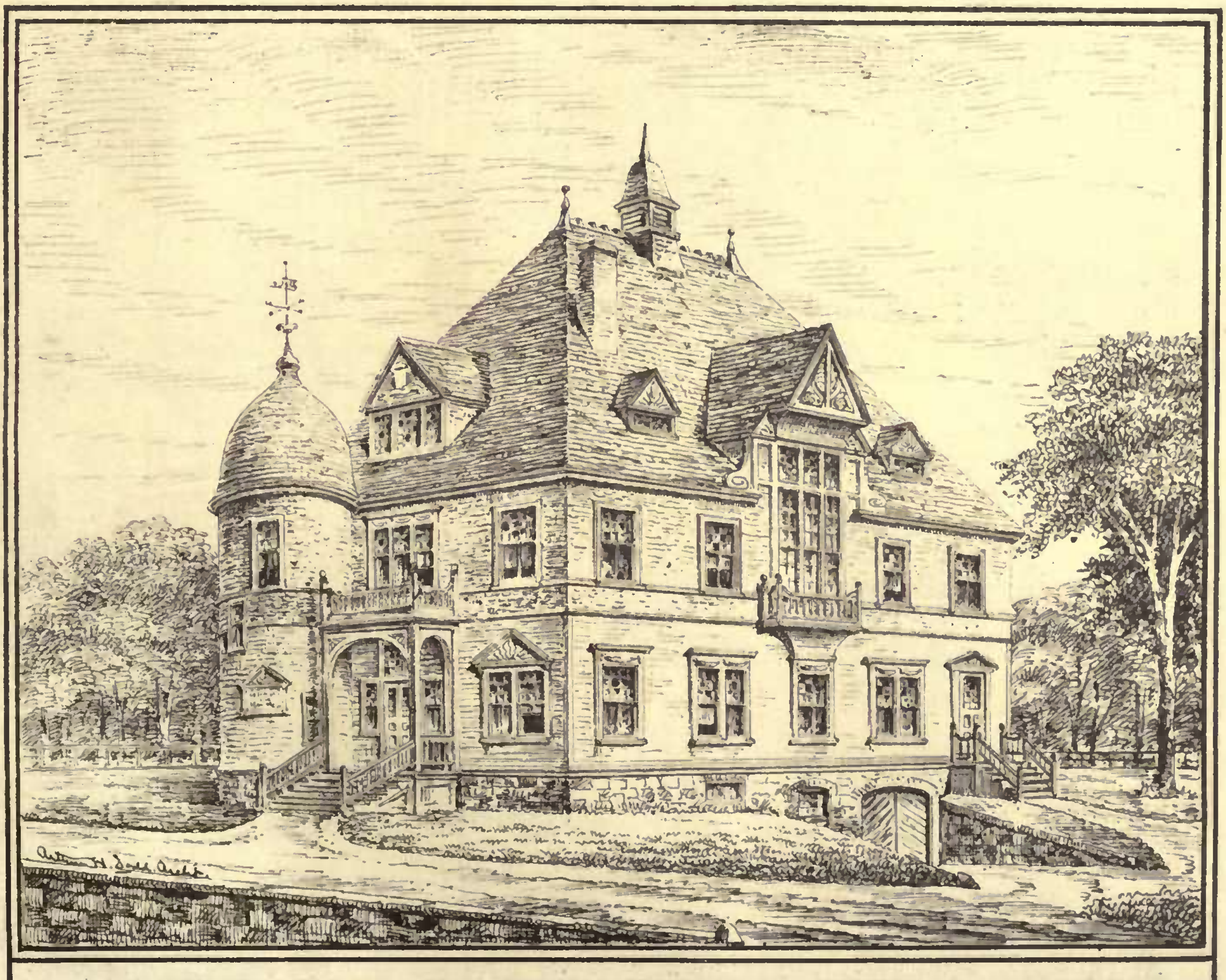

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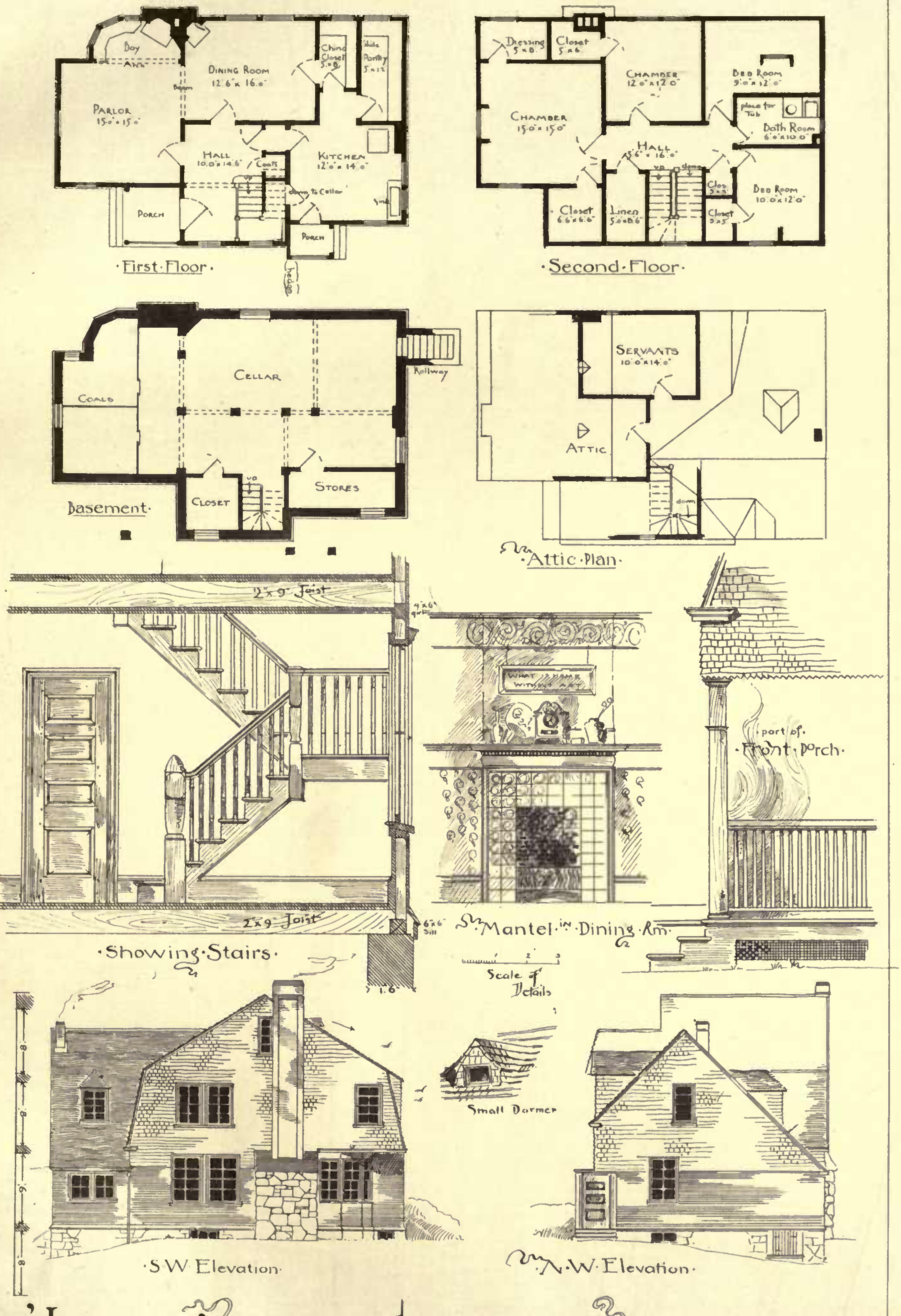

'Joanna' : American·Archt·Competition

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entirely destroyed the porosity of the walls. The evaporation outside of the damp arising inside was thus rendered impossible, and the houses became so extremely unwholesome that they had to be abandoned. The money spent in their construction was entirely lost. Dr. Meijer, therefore, is in favor of maintaining the porosity of all the walls; the partition or internal walls, as well as the outer walls, and this porosity he would further extend to ceilings, roofs, and floors. In fact, every house should be made as porous as possible, unless a very perfect system of artificial or mechanically contrived ventilation be introduced which will work as effectually during the night as during the day.

From all these arguments we may, perhaps, conclude that where the danger of infection is especially great, as, for instance, in hospitals; and where, at the same time, means of artificial ventilation are more easily established, it would be preferable to follow Dr. Vallin's advice, and destroy the porosity of the walls, and especially that of their inner surfaces. On the other hand, for private dwellings, where the presence of disease germs and organic matter in the atmosphere is not prevalent to so great an extent, it would be preferable to follow the advice given by Professor Van Overbeek de Meijer. The science of ventilation is not yet sufficiently understood for us to safely dispense with the accidental ventilation that so often helps to compensate for the ignorance or indifference of the public, and this view we have long held and often expressed. In England, however, the porosity of walls has been studied, not so much with a view to its effect on ventilation as to its influence on the dampness of dwellings. The exceptionally damp characteristics of the English climate, and the particularly porous nature of the bricks with which the greater part of our houses are built, have naturally led the public to patronize the paints and distempers which profess to exclude moisture. In seeking to attain this latter end, but few persons have paused to consider how far they interfered with ventilation, or prevented, especially when applying their paints to the outside of the house only, the oxidation, by infiltration of pure air, of the organic and putrescible matter absorbed within the pores of the walls.

In this respect, however, our attention has been called to what would appear to be a happy compromise. Mr. J. B. Orr suggests the following experiment with the distemper he has patented under the name of *Duresco.* He proposes that a brick should be partially scooped out and painted over with *duresco.* It will then, he maintains, retain water in the hollow till evaporation; just, in fact, as if it were a porcelain saucer. The distemper, therefore, is thoroughly water-proof. But, on the other hand, if the same brick is placed in an air-pump, it is easy to draw air through where water was unable to pass. Thus, while excluding damp, the ventilation through the pores of the walls need not be altogether hindered; and there may still be some hope for the disinfection by oxidation of the body or substance of the walls. Such facts, when established by extensive experiments and vindicated by practical experience, would be of the utmost value; but, as the matter now stands, the whole problem is yet in the infancy of discussion. It would be somewhat presumptuous, with the limited evidence before us, to attempt to offer a definite answer to the questions suggested. We can, however, with confidence maintain that the experiments of Pettenkofer, of the Russian Pathological School, of M. Somasco, of Dr. De Meijer, and of many others, clearly prove that the porosity of walls is an important factor, for good or for evil, in the sanitation of dwellings, and should become the subject of more extensive and practical studies. — *The Builder.*

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR A $3,000-HOUSE, SUBMITTED BY "*Joanna.*"

SHOULD any of our non-professional readers desire to build according to this design, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

BITS FROM COTTAGES. MR. FREDERICK B. WHITE, ARCHITECT, PRINCETON, N. J.

UP-RIVER CLUB-HOUSE FOR BACHELORS' CLUB OF PHILADELPHIA. MESSRS. HAZLEHURST & HUCKEL, ARCHITECTS, PHILADELPHIA, PA.

TOWN-HALL, SHARON, MASS. MR. ARTHUR H. DODD, ARCHITECT, BOSTON, MASS.

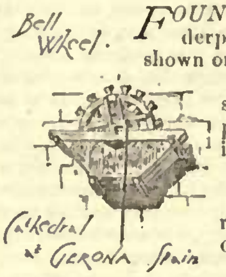
ELECTRIC ILLUMINATION BY REFLECTION. — D. V. Partz exhibited a plan of a new mode of electric lighting, at the French Electric Exposition. The light was placed in chambers underneath the street, and reflected through hollow cylinders, enamelled on the inside, so as to produce an inverted cone of rays, which strike a reflector placed at a height of 40 or 50 metres above the street. Among the advantages which are claimed by the inventor are: The employment of powerful electric foci, thus avoiding the loss which results from the division of the current; the equal diffusion of the light and the avoidance of the dazzling glare; the diminution of the loss of light which results from the employment of translucent globes; the readiness of access for regulation and surveillance; and the illumination of thick mists, which can be penetrated with difficulty by other methods. — *La Lumière Electrique.*

THE $3,000-HOUSE COMPETITION.[1] — III.

DESIGN SUBMITTED BY "*Joanna.*"

MASON'S SPECIFICATIONS.

FOUNDATIONS of rubble-stone laid dry. Underpinning of brick 8″ thick. Build piers where shown on plan, 8″ x 12″.



Chimneys: — Outside chimney of rough stone to second floor. Flues 8″ x 8″. Fireplace of rough brick. Tiles, hearths and facings furnished by owner.

CARPENTER'S SPECIFICATIONS.

Framing: — Sills, 6″ x 6″; studs, 2″ x 4″; rafters, 2″ x 7″, 16″ o. c.; joist, 2″ x 9″, 18″ o. c., bridged.

Boarding of sound hemlock boards.

Gutters: — Stearns's gutters, 4″ x 5″.

Conductors: — 2½″ of zinc.

Clapboards: — Cover, where shown, with spruce clapboards.

Shingles: — Cover roofs and walls, where shown, with sawed pine shingles laid 4″ to weather.

Outside Finish to be of pine.

Front Porch: — Balusters and plain post, turned as shown on detail-drawings.

Inside Finish of pine, to paint. Sheathing in Kitchen 4′ high.

Closets: — China-closet and pantry to be fitted up with shelves, etc. All other closets to be fitted up with shelves and hooks.

Doors: — Four panels, factory make.

Windows: — Eight lights, factory make.

Stairs of pine; to have plain turned baluster and posts. Newel post, 5″; corner posts, 4″.

Water-Closet: — Build all necessary wood-work in connection with plumbing.

PLUMBING SPECIFICATIONS.

Furnish and put in place one water-closet and bowl, and one Kitchen sink, and make all necessary connections.

PAINTING SPECIFICATIONS.

Two-coat work as directed by architects.

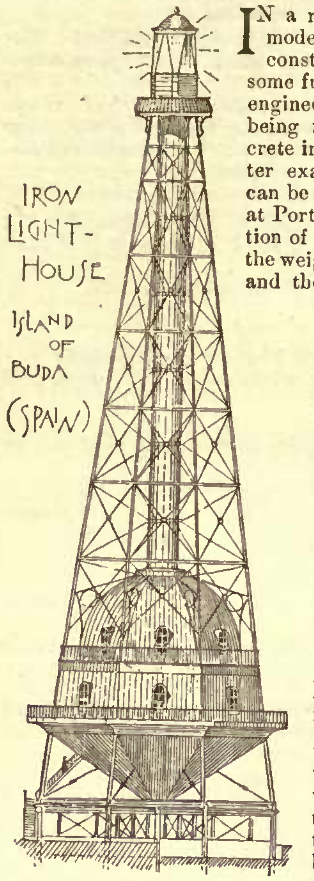
ESTIMATE OF QUANTITIES AND PRICES RULING AT BOSTON, MASS.

Item	Amount
10,000 ft. spruce timber, @ $17	$170.00
5,000 ft. partition and furring stock, @ $16.00	80.00
8,000 ft. covering-boards, hemlock, @ $15.00	120.00
1,000 clear spruce clapboards	30.00
27,000 sawed pine shingles, @ $4.00	108.00
1,500 ft. stock for outside finish	60.00
120 ft. 4″ x 5″ Stearns's galv'd conductors, @ $15.00	29.40
Windows complete, factory make	150.00
Doors and frames, " "	175.00
Front and side porches	75.00
Inside finish, pine to paint	225.00
Spruce floor throughout	90.00
Stairs, of pine	125.00
Hardware and nails	160.00
Carting and mill-work	6[illegible].00
Carpenter's work	550.00
Carpenter's total	$2,207.40
MASON'S WORK.	
25 sq. yds. of excavation, at $2.50	$62.50
Grading	20.00
55 perch stone, @ $1.75	96.25
Laying do. and pointing, at $1.25	68.75
3,500 bricks for chimney, @ $10.00 / 1,000 " underpinning	75.00
Labor for laying same	60.00
1,150 yds. plastering, @ 25c	287.50
2 fireplaces and hearths	50.00
Mason's total	720.00
Carpenter's total	2,207.40
Painting, total	250.00
Plumbing, total	125.00
Architect's commission	100.00
Grand total	$3,402.40

A TREE-PLANTING ACT.— The Hon. Mr. Wood has introduced a bill in the Ontario Parliament to encourage tree-planting, as follows: A bonus not to exceed twenty-five cents shall be paid for each tree, of a certain named species, which shall be planted along a highway, or farm boundary line, or within six feet of such line. Trees planted along highways are to be the property of the owners of adjacent lands, but the trees are not to be cut down without permission of the authorities. Trees planted on a farm boundary are to be the joint property of the owners of the two farms. The scheme involves inspectors to see that the regulations of the proposed law are carried out. The Toronto *Globe* suggests some difficulties that would arise in the way of the operation of this act. It doubts if the farmers of the Province are yet educated up to the utility and æsthetic ideas involved in the regulation sought for. There are yet only 10,000,000 acres cleared of the 130,000,000 in the province, and the 10,000,000 is mingled with three times that area of land still under forest, so that it is obvious that the process of deforesting Ontario cannot yet have gone far enough to produce any of those evils from which European and Asiatic countries, once forested, but now desert wastes, are suffering. Yet, while the rural owners might not encourage the tree-planting act on any broad ground of future public benefit, they might be induced to plant trees for twenty-five cents each, and continue to do so, and value the trees when grown very highly.— *Northwestern Lumberman.*

[1] By a typographical error in printing estimate of "*Home,*" the "carpenter-work not included in above" was made to appear $6.50 instead of $650.00 as per our manuscript. — "*Home.*"

ON THE USE OF CONCRETE IN MARINE CONSTRUCTION.—II.



In a recent number,[1] we dealt with some modes of employing concrete in marine construction. We now propose giving some further notes on this subject. French engineers justly deserve the distinction of being foremost in the application of concrete in marine works, and perhaps no better example of their skill and ingenuity can be selected than the method employed at Port Napoléon, Brest, in the manipulation of large artificial blocks. In this case the weight of each block was about 100 tons, and they were all built above high water, each on a separate timber platform, or carriage, resting on a slip with three longitudinal ways or runners of timber about 7 feet 9 inches apart, centres, the upper part of which was rounded to receive bearing pieces hollowed out to the same curve to prevent lateral motion attached to the platform, which was thus enabled to slide freely down the ways into the water. The blocks, when sufficiently consolidated, were launched as required by means of two endless chains travelling the whole length of the slip, one on each side of the block. After submersion and when the tide had risen to a convenient height over the block, it was lifted by an iron float and carried, while under water, to its destination in the work; when relieved of the weight, the timber carriage floated to the surface and was transferred to the head of the slip ready to be used for another block. The slip was about 380 feet in length, and could accommodate 28 to 30 blocks, so that the work was capable of being carried on with little interruption.

The ways had an inclination of 1 in 16.6, or about ¾-inch per foot. The blocks varied in size, averaging about 16 feet 6 inches long by 9 feet 10 inches broad, and 8 feet 10 inches high; they were at first built inside an enclosure embanked to a height of 6 feet or 7 feet above low-water zero, this, however, involved so much tidal work that it was abandoned in favor of the slip.

In lifting the blocks ordinary chains were at first used, fitting into grooves built into the sides and bottom; this method, however, was found inconvenient and did not permit of the block being relifted in case of necessity. Four T-headed rods were, therefore, substituted for the chains, suitable rectangular openings being formed vertically in the block, the T-heads bearing on hard-wood pieces covered with sheet-iron on the under side, and built into the block about one foot from its base, at which level small chambers were formed to permit the rods being turned when lifting or letting go the blocks. The cubic contents of the blocks averaged about 53 cubic yards each and weighed in air, as before stated, about 100 tons; they were built of rubble masonry set in cement-mortar consisting of one part cement to four of sand.

Four comparatively small iron hopper-floats were employed in the work, for depositing the rubble required for the foundation mound, and for removing dredged material, etc., the hopper doors being so arranged that when open their lower edges did not project beyond the bottom of the float. One of these floats was also utilized for lifting and setting the concrete blocks; their dimensions are given as follows:—

	ft.	in.
Length	92	0
Breadth	16	6
Draught, light	1	8
" with 125 tons	4	9

In lifting the blocks four balks of timber were placed on the deck of the float, connected in pairs and fixed over two pairs of openings through the float, each pair of blocks having a clear space between them of about 15 inches, so as to permit the free passage of the suspender bars and chains; the balks carried four winches with pitch chains and pinions, worked by screws. On a rising tide, and when the water had risen sufficiently high, the float was accurately placed over the block to be lifted, the four T-headed bars were lowered into the vertical openings in the blocks, the chains were then tightened and the block gripped. As the tide rose the float was immersed until the displacement equalled the weight of the block, which would be about 55 tons in sea-water, the float then drawing about three feet. The float with the block attached was then towed to the position the latter was intended to occupy, and when the tide had fallen sufficiently the block was carefully lowered into its place; it was found that after a little practice the blocks could be laid with great precision in two tiers one over the other.

[1] See *American Architect* for December 16, 1882.

One float only was used with the blocks, and in order to insure accuracy in ranging and setting, advantage was taken of the most favorable states of the tide. Under these circumstances, it was sometimes necessary to work by night, and the average rate at which the blocks could be deposited was thirty per month, which represents 36,000 tons, or (taking 16 cubic feet equal to 1 ton) about 21,-300 cubic yards of material built into the structure under low water per annum, which is equivalent to 120 tons, or about 70 cubic yards per day, allowing 300 working-days to the year; about 50 lineal feet of quay wall, including superstructure and block-work, was completed per month.

It is evident, however, that the system is capable of being employed on a much higher scale by using several floats, which would not only enable the work to proceed with much greater rapidity, but permit far more advantage to be taken of fine weather, thus increasing both the facility and economy of the necessary operations.

The lifting float used at Brest was capable of carrying blocks of nearly double the weight of those adopted, and it does not appear that the weight need have been restricted to 100 tons. There was, however, some difficulty in obtaining a good foundation for the slip, which may have rendered it desirable not to impose an excessive weight upon it.

With reference to the cost of the work, we are indebted to the courtesy of M. A. de Miniac, engineer of the Arrondisement of Brest, for the following information:—

The cost of the float, with its accessories for lifting and setting the blocks, amounted to £2,350, but the float was constructed so as to be also used for the transport of stone and other materials, and was, as before mentioned, of much greater lifting capacity than actually required.

The cost of masonry of the blocks was 15*s.* 8*d.* per cubic yard, viz., materials, 10*s.* per cubic yard; labor, 5*s.* 8*d.* per cubic yard, the last-mentioned item including the cost and use of the platform or carriage on which the block was built. The expense attending the launching of each block amounted to 8*s.*, and the cost of lifting, transporting, and setting in place, averaged 31*s.* per block, or about 8*d.* per cubic yard, making the total cost per cubic yard of the block-work about 16*s.* 6*d.* In addition to the lifting float, the only other item that can be considered in the light of special plant is the slip or launching ways, the exact cost of which is not obtainable, as it was constructed concurrently with other works from Government materials. The slip, however, was of comparatively light design, and probably did not involve an expenditure exceeding £1,200.

The blocks were laid on a foundation of loose rubble, for the transport of which, as well as of dredged material, the float used for lifting the blocks had been designed and used; the slip can also be subsequently employed for ordinary repairing purposes, so that in comparing the cost of the special plant with the cost of that used in other works of a similar character, only a portion of the gross cost of the float and slip should be included. If the total cost of the special plant be taken at £4,000, which is probably rather in excess of the actual cost, then at the end of five years' working, if interest at the rate of five per cent per annum is added, and one-fourth of the cost of the special plant deducted—although in the particular instance under consideration, one-fourth of the first cost is hardly sufficient to represent the selling value of the plant—we find the amount chargeable for the use of special plant to be rather more than 9*d.* per cubic yard of block-work.

The system adopted at Brest possesses many advantages: the submergence of the block before lifting not only reduces the weight to be lifted, from 100 tons to about 55 tons, but the position of the block during transit increases the normal stability of the float, enabling it to bear with safety the disturbing influences of the waves; the block being suspended from the centre instead of from the end of the float, prevents the necessity of a counterpoise, and thus the required displacement is reduced by one-half, the size of the float being proportionately diminished, which is a matter of great convenience, particularly when the works are carried on in a river or harbor much frequented by shipping. To these advantages must of course be added the great economy in the first-cost of plant, and also the consideration that both the items of special plant, after the completion of the work, are but comparatively little diminished in value, inasmuch as they can be transferred to the necessary and permanent plant to be subsequently employed in works connected with the maintenance of the harbor, and other purposes.

Compared with the example first noticed, namely, Aberdeen, the harbor of Brest lies in a much more sheltered position, and therefore presents less difficulty in the lifting and depositing of the blocks in the manner just described; but on the other hand, blocks of double the weight might be used, and thus much greater advantage could be taken of the occurrence of calm weather, which in an exposed position is absolutely necessary if the blocks are to be floated into position. The tidal range at Brest is considerable, ordinary spring tides rising about 50 feet and neaps about 14 feet; this materially increases the facility with which the work can be carried on; a slight modification of the same system, however, renders it applicable to ports in comparatively tideless seas; for example at Fiume, on the northeast shore of the Adriatic, where the rise of tide is but slightly over three feet, a similar arrangement to that at Brest has been adopted.

The largest blocks in this instance measured 12′ x 6′ 6″ x 5′ and weighed about 25 tons each; they consisted of about ten parts by measure of Santorin earth, four parts lime, and one part sand; the block-yard was sufficiently large to contain about 1,000 blocks, and they were allowed to harden for three months before use; they were transported on tramways worked with ropes driven by steam. In launching, the block was allowed to run down a slip into the sea until its upper surface was slightly below the water; a raft was then floated over it, consisting of two boxes or floats connected at the top by a timber framework, and placed at such a distance apart as would allow the passage of the block between them; water having been admitted into the floats or chambers by suitable valves, the raft was let down over the block, which was then suspended by chains from the raft; the water being rapidly pumped out of the chambers the block was lifted and the whole towed into position. Water being again admitted into the chambers of the raft it was allowed to sink gradually and was guided into its place by a diver; the chains were then removed, and the raft again rose to the surface. The work was designed by the French engineer Pascal, and the block-work, like that at Brest, is laid on a foundation mound of loose rubble or *pierre perdu*. The depth of the water varied between 29 feet in the old harbor, 72 feet at the end of the first mole, and 131 feet near the end of the breakwater. The level of the top of the rubble mound is not stated, but at Brest it is about 15 feet below low water of ordinary springs.

With reference to the block-work at Brest the following summary is given for convenience of comparison, the amount per cubic yard chargeable for special plant being computed after five years' and ten years' continuous working respectively: —

	£	s.	d.	
Quantity of block-work deposited in place per year				21,240 c. yds.
Approximate cost of special plant	4000	0	0	
Cost of blocks—materials	0	0	0	per cu. yd.
" " " labor	0	5	8	" "
Launching, transporting, and setting of blocks (including maintenance of slip and float)	0	0	10	" "
Proportion of cost of special plant at the end of five years	0	0	9	" "
" " " " " " ten "	0	0	5½	" "
Total cost if work was continued 10 years (exclusive of cost of levelling foundations)	0	17	0	" "

It will be more convenient to reserve for the present any remarks on the relative merits of different sections of breakwaters and quay walls, but it should be observed that the levelling of the top of the mound so as to form a suitable foundation for the blocks is a very important item in the cost of structure.

In the case of Brest the preparation by divers for the reception of the bottom blocks would amount to about £8 for each block, and add (where two tiers of blocks were used) about 1*s.* 6*d.* per cubic yard to the cost, making the total cost of the finished block-work about 18*s.* 6*d.* per cubic yard.

The simplicity and economy of the arrangements adopted at Brest, and the rapidity with which the work can be executed, highly commend the system, and in few others has the cost of special plant been so extremely moderate. — *Engineering.*

THE YELLOWSTONE PARK.

TREASURY DEPARTMENT, OFFICE OF THE SUPERVISING ARCHITECT,
February 8, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — In your comments this week upon the project of leasing the Yellowstone National Park to a company of capitalists, of which Mr. Rufus Hatch is President, you refer to what are perhaps the least of many objections to such a scheme. The Park can be visited by tourists only about three and a half or four months of the year, and during the brief time at their disposal, they would doubtless give themselves up to the tender mercies of a monopoly there, as willingly as they do now in the White Mountains and at several other resorts. On the other hand, the profits arising from the entertainment and transportation of all the visitors that are likely to go to the Park for many years to come will pay but a small percentage on the large capital this company proposes to use there. The "farming privileges" and "the free use of timber, wood and grazing lands" which are included in the lease are the inducements which have attracted this investment, and it is the avowed intention of the company to pasture ten thousand or more cattle every year upon the "waste lands" in and about the Park. The Act of Congress establishing this park placed it under the control of the Secretary of the Interior, and says, he "shall provide for the preservation from injury or spoliation of all timber, mineral deposits, natural curiosities, or wonders within said park, and their retention in their natural condition," also "he shall provide against the wanton destruction of the fish and game found within said park," etc. How long would these remain in their natural condition if this company obtained control?

There are known to be, within the limits of the Park, three distinct herds of buffaloes, and their pasturage, hardly accessible to the ordinary tourist, is the finest of the "waste" grazing land. Moose, elk, white-tail and black-tail deer also frequent the Park in large numbers. The Park is large enough to maintain its natural fauna almost indefinitely, if undisturbed; and yet tourists can visit all the lakes, geysers, cataracts and other attractions to their heart's content. Small game will take care of itself, but the large animals mentioned above are rapidly becoming extinct, and unless provided with a refuge secure from hunters, farmers and stock-raisers will soon be gone forever. If these animals must become extinct in time, it is none the less our duty to strive to avert the loss as long as possible.

The Yellowstone Park has so few entrances by which it is accessible, and so few roads by which it can be traversed, that the expense of police to guard against wilful destruction and injury will always be very slight. No other nation ever had such an opportunity to acquire and maintain in its natural state so large a tract, and at a cost next to nothing.

I hope you will pardon so long a letter upon this subject, but students of natural history and all others interested in the preservation of our larger animals are earnestly protesting against this project to convert Nature's own museum into a vast cattle-range for money-making purposes, and I cannot but think you have either been misinformed or have not thought over all the consequences, or you would not advocate the cause of these speculators.

Very truly yours, J. E. HOSFORD.

[OUR information was derived from the Report of the Secretary of the Interior. — EDS. AMERICAN ARCHITECT.]

A PERSONAL CORRESPONDENCE.

No. III.

1208 K Street, N. W., WASHINGTON, D. C., February 8, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — I think your letter of the 3d inst. very nicely worded to cover your real meaning.

If it is true, as you write, "We regret that we are obliged to return the drawings unused," why did you not keep them until ready to publish?

In the number of your journal published on the 6th of January you complain that you cannot obtain drawings of city buildings, and therefore the most of the illustrations in the *American Architect* are of country houses.

I have heard it frequently asserted that only a certain clique of architects could have their drawings published in the *American Architect*—you of course know whether this is true or not. I am,

Your humble servant, ROBERT STEAD.

No. II.

BOSTON, February 3, 1883.

MR. ROBERT STEAD: —

Dear Sir, — As requested by your favor of January 20, whose real meaning [that the drawings were to be returned at once] we have just discovered, we return the tin can of drawings which you sent us some time ago.

We regret that we are obliged to return the drawings unused, and we will say in explanation of this and in apology for their not having been published before this date, that owing to the drawings having been kept in the tin case for the sake of preserving the accompanying tracings uninjured, instead of placing them in our portfolios together with the other drawings that await publication, they have been entirely overlooked, and we were quite unconscious of having such drawings in our possession until your letter caused us to make a search for them. Very truly yours, THE EDITORS.

No. I.

1208 K Street, N. W., WASHINGTON, D. C., January 20, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — Enclosed find thirty-five cents to pay express charges on can and drawings sent by me for publication in your paper.

Trusting to receive the can of drawings *at the earliest possible moment,* I am, Very respectfully yours, ROBERT STEAD.

[As Mr. Robert Stead may very properly feel that by impugning not only our veracity but also the honor and equitableness with which we conduct this journal he has debarred himself from profiting in the future by such advantages as derive to an architect by the publication of his designs in our pages, we desire to afford him such notoriety as the publication of the foregoing correspondence can give. — EDS. AMERICAN ARCHITECT.]

UNWISE ASSISTANCE TO CONTRACTORS FOR PUBLIC WORKS.

CHICAGO, February 7, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Referring to the application of the contractors for the Indiana State House for an increase of pay, in your issue of December 30th, after saying that in case of the inability of the contractors to go on the bondsmen ought to assume the contract, you add "the cost of doing so would certainly be less than taking it up after the bankruptcy of their principals, and they might, we think, rely with reasonable certainty on being indemnified at the end of their outlay."

Speaking as a contractor, who has also had considerable experience as an architect, I think that you suggest a possible solution of the difficulty which would set a very mischievous example, fraught with injury to every honest contractor. Scarcely ever are bids received for public buildings, but that some are made at or below the cost price of the work, and contractors at such prices seem to be able to find bondsmen to back them, quite as well as those who demand a legitimate price for their works. The result of this sort of contracting you and your readers well know. In some cases the bid

is made to get the job *at any price*, with the expectation of subsequently making such arrangements with the architect or committeemen, through specifications subject to double meanings, or the addition of unnecessary extra work, or changes involving small deductions and larger additions, as will make the work profitable. Against such combinations it is useless for legitimate contractors to compete, and numerous cases of this kind make them indifferent to public work.

But the interests of trade and the public interests as well are just as much injured by the letting of large contracts to any one at prices manifestly below cost and beyond the ability of contractors to complete, even though they may be so public-spirited in intent as to desire to make their own contributions toward the erection of public buildings. These cases occur often on account of the mistakes made in figuring, or inability to fully comprehend the nature and extent of materials and work specified, on the part of contractors ambitious to handle work outside of their own trade, and take large contracts.

It is evident that the two main causes of this kind of contracting are dishonest intentions, and incompetency. These are at enmity with all legitimate contracting or honest competition. They are baneful to the respectable builder throughout his whole existence as such. If discouraged by them he has to either adopt the tactics of the former class or give up public work altogether. Anything which tends to help out "lame ducks" of any kind makes legitimate business all the more discouraging. The sooner this class of contractors is held to strict accountability and compelled to shoulder its full responsibilities the better for all concerned. There should be no opportunity for compromise with them, but if they court failures by their own mistakes they deserve to be ruined.

I say this without vindictiveness, but because it is the natural course of business. And I see no reason why the building business should be governed by different laws or precedents from any other.

It may be said, and I admit, that it is nobody's business if a man bids below cost, provided he furnishes adequate security. I do not think it is possible to discriminate when contracts are let. But I hold that if the enforcement of contracts were exacted and blunderers and incompetents were driven to the wall, such things would not occur in the future.

Respectfully yours, P. B. Wight.

[Mr. Wight misunderstands us if he thinks that we regard the practice of indemnifying contractors for losses sustained on public works as wholly unobjectionable. All we meant to say about it in the case of the Indiana State-House was that it is a common one, and this every one knows. At the same time, we do not quite share the contempt for "lame ducks" which Mr. Wight expresses. The task of estimating upon a large public building is a very difficult one, except for the few who have, or can have, experience in such work, and with the best intentions a man may make mistakes, or if not that, may fail to make sufficient allowance for variations in wages during a long contract. In such a case there are two alternative courses for the contractor to follow. He may defraud his men of their wages, cheat in his materials or workmanship, make continual demands for extras, crawl out of his engagements in every possible way, and finally collapse in disastrous bankruptcy; or he may keep faithfully and steadily to his contract, sacrificing his private means until they are exhausted, and then, calling his bondsmen to his help, do, with them, all that a conscientious fulfilment of his and their obligations would require, until the contract is completed. There are examples enough of the former course of proceeding to make it worth while to encourage the latter, and if a city or state thought fit afterward to come to the relief of such a contractor and his bondsmen, we should be the last to object. In the case of the Indiana State-House we understand that the contractors offer, if their outlay is made up to them, to continue their care and supervision until the building is completed, without even asking for any pay for their time and service. Such a settlement as this does not afford a very tempting prospect for dishonest bidders, and while we cannot but applaud the business-like prudence of the Commissioners, who have secured the State against loss in any event, we should not be sorry to hear that the State of Indiana, unwilling, like many private persons whom we have known, that any person who had acted conscientiously toward her should suffer by his faithfulness, had consented to grant the indemnity asked for. — Eds. American Architect.]

THE $3,000-HOUSE COMPETITION.

Boston, February 6, 1883.

To the Editors of the American Architect: —

Dear Sirs, — It seems to me the correspondent in the last *Architect*, signing himself "C," is a little hasty in saying that he knows that the design submitted by "*Danfors*" cannot be built without a much larger expenditure of money than the estimate given. I have had the design estimated by two builders, one from Boston well known by many of the leading architects, and the other by a builder living in the suburbs, having a large business (James T. Blaisdell, of Watertown). Either of these builders is willing to take contract for building such a house, at the estimate given.

Yours truly, "*Danfors.*"

DRAWINGS FOR PUBLICATION.

Toronto, February 5, 1883.

To the Editors of the American Architect: —

Sirs, — Will you kindly inform me, either by mail or through the *American Architect,* what size drawings should be made when intended for reproduction in your pages—how much larger than the illustration as published—and oblige, Yours truly,

David B. Dick.

[Reproductions are most satisfactory when made from drawings from one-half to three times as large as themselves in linear dimensions. Everything, of course, depends on the character of the rendering the draughtsman has elected to employ. No drawing can satisfactorily be reproduced full size. — Eds. American Architect.]

Toronto, January 24, 1883.

To the Editors of the American Architect: —

Dear Sirs, — We are almost always disappointed by the meagre information furnished regarding the illustrations, as to finish, material, *cost*, etc., the latter especially.

In sending matter for illustration is it necessary to send such unrolled?

Would a tracing on cloth be suitable, and could a solar print be reproduced? Very truly yours,

Langley, Langley & Burke.

[It is as much a source of disappointment to us as to our correspondents, that our contributors are so chary of communicating facts concerning the buildings which are illustrated in our pages, and we feel that the course followed by the majority of our contributors is a distinct injustice to themselves as well as to the journal and its readers. Drawings may be forwarded flat or rolled at the convenience of the sender, and may be made on paper, tracing-paper or tracing-cloth. Solar prints are useless for purposes of reproduction. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Bids for the New Law Courts, London.— Since the failure of the builders of the new Law Courts of London — Joseph Bull & Sons — was made known, the various bids originally received for the work have been published for purposes of comparison. They show that the bid of the firm that has failed was over $150,000 dollars less than the next highest, and over $1,400,000 less than the very highest.

A Curious Effect of Lightning.—At the Puy-de-Dôme Observatory in France, some singular effects of lightning discharge have been noticed on the copper cups of a Robinson's anemometer mounted on the roof. The surface of the metal is curiously pitted and from the centre of each pit rises a small cone or nipple of copper, smoothly polished, as if it had been turned in a lathe. Those cones of fusion produced by the electric discharge remind one forcibly of the carbon points in an electric lamp, and indicate, as we have before remarked, a gyratory movement of the electric current.— *Engineering.*

Fire-proof Paint.— Vildé and Schambeck make a varnish of 20 parts of powdered glass, 20 parts porcelain, 20 parts powdered stone of any kind, 10 parts calcined lime, 30 parts soluble soda glass. The powders are made as fine as possible and sifted, and then thoroughly incorporated with the soluble glass, thus producing a syrupy mass, which can be employed as a varnish or mixed with colors for painting. The proportions of the solid ingredients may be varied at pleasure, but it is generally best to keep the indicated portion of lime. Silicate of potash may be substituted for the silicate of soda if desired. The first coating soon hardens and a second coat may be applied from six to twelve hours afterwards. Two coats are sufficient. The varnish may be employed as a preservative against rust.— *Chronique Industrielle.*

Mysterious Wells at Shiraz. — In the neighborhood of Shiraz, on a hill an hour's ride to the northeast, the traveller comes upon some wells which would also seem to date back to the days of the Great King, for the labor involved in their construction certainly points to a dynasty more magnificent in its undertakings for the royal pleasure than either the Parthian, the Sassanian or the Arab. Near the top of this very precipitous hill, with no trace of masonry to mark the site of fort or palace, there yawns an opening, perfectly rectangular, about eight yards by six, which is the mouth of a well going straight down into the bowels of the mountain. The shaft is cut in the live rock, the sides are as perpendicular as the plumb-line could make them, and the depth, as ascertained by the time of a falling stone, something under four hundred feet, the bottom at present being dry. Within a distance of fifty yards on the same hill are two other similar wells; and local tradition asserts that there is underground communication among the three. This theory finds support in the fact that when a pistol is fired at the mouth of one of these wells with a view of disturbing the siesta of the pigeons who flock thither at the noontide heats, the noise made by their wings, at first very loud, gets gradually fainter, as though the birds were escaping through some lateral galleries. They certainly betake themselves in some manner away from the perpendicular shaft without coming out at the upper mouth, though there is no evidence to prove that their exit takes place through either of the other two wells. The labor expended on the boring of these wells must have been enormous. If the object was merely to secure the water-supply for some fort which originally crowned these heights, one cannot see why a shaft twenty-four feet by eighteen, and so accurately cut, should have been required. Were they indeed wells, or were they intended as passages for the sudden exit of troops from some fortress built here to hold the plain in awe? In the latter case, some sort of spiral staircase would necessarily have been attached to the walls of the shaft, of which at the present day no trace remains. Unfortunately for science, no traveller has yet visited Shiraz sufficiently enterprising to go down the four hundred feet of perpendicular side with rope or ladder. Curious relics of by-gone times might certainly be found at the bottom, but without a proper windlass and better ropes than those now made in Fars, the risk of a broken neck would cool the ardor of the most venturesome antiquary; and so, up to the present, the pigeons alone enjoy the sight of the secret treasures which possibly lie at the bottom of these astounding shafts. As we have said before, there is now no vestige of building left on the hill to indicate in any way the date of their construction, nor is there any inscription apparent on the side of any of the wells to aid us in our investigations. Tradition, as usual in Persia in the case of anything out of the common, ascribes the work to Suleiman ibn Dáúd and his Jinns. — *Saturday Review.*

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

271,209. COMPOSITE BUILDING-MATERIAL AND THE METHOD OF PREPARING THE SAME. — Frederic W. Bartlett, Buffalo, N. Y.

271,219. BENCH-PLANE. — John Campbell, Walden, N. Y.

271,234. METHOD OF REPAIRING STRUCTURES WITH BETON OR CONCRETE. — John C. Goodridge, Jr., New York, N. Y.

271,250. PIPE-CUTTER. — Israel Kinney, Windsor, Ontario, Can.

271,261. WATCH-TOWER AND SIGNAL-LANTERN. — Clair S. Parkhill, Hornellsville, N. Y.

271,264. ELEVATOR. — Russell Phillips, Boston, Mass.

271,268. SPIKE-EXTRACTOR. — Albert P. Prout, Woodhaven, N. Y.

271,271. LOCK. — Lyman Rhoades, New York, N. Y.

271,303. AXE-HANDLE. — John D. Blaker, Newtown, Pa.

271,308. KNOCKDOWN OR PORTABLE BUILDING. — Lars F. Bronnum, New York, N. Y.

271,309. LATHING AND FURRING. — William H. Brown, Indianapolis, Ind.

271,316. VISE. — Daniel Davis, Elmira, N. Y.

271,341. ARCH. — Thos. J. Lovegrove, Philadelphia, Pa.

271,346. DEVICE FOR CONSTRUCTING BRICK FLOORS AND ARCHES. — Asa Mattice, Cleveland, O.

271,353. ELEVATOR. — Charles R. Otis, Yonkers, N. Y.

271,356. WATER-CLOSET. — Chas. F. Pike, Philadelphia, Pa.

271,357. CLEANSING AND DISINFECTING WATER-CLOSET BOWLS AND THEIR TRAPS. — Chas. F. Pike, Philadelphia, Pa.

271,358. CLEANSING WATER-CLOSET AND OTHER TRAPS. — Chas. F. Pike, Philadelphia, Pa.

271,359. APPARATUS FOR ABSORBING SEWER-GAS IN WATER-CLOSETS. — Chas. F. Pike, Philadelphia, Pa.

271,367. SASH-FASTENER. — Jacob S. Sammons, New York, N. Y.

271,368. WOOD-TURNING LATHE. — Albion I. Sanborn, San Francisco, Cal.

271,384. WINDOW-SHUTTER. — Charles E. Weber, Monroeville, Ind.

271,422. FIRE-ESCAPE. — Geo. H. Clowes and Edward L. Frisbie, Jr., Waterbury, Conn.

271,429. FIRE-ESCAPE. — Jarvis E. Davis, Union, Oreg.

271,438. WINDOW-SHADE ROLLER. — Wm. F. Edwards, Cincinnati, O.

271,469. PROCESS OF ORNAMENTING WOOD. — John P. Jamison, Cambridgeport, Mass.

271,479. KNOB-ATTACHMENT. — Francis Lattimer, Richmond, Nova Scotia, Canada.

271,489. PORTABLE STEAM-AUGER. — William F. Leach, St. Clair, Mich.

271,498. FIRE-ESCAPE. — James H. McElroy, Middletown, N. Y.

271,509. TRESTLE OR PLATFORM ATTACHMENT FOR LADDERS. — Thomas J. Nolton, Lake City, Col.

271,557. SPLASH-BOARD FOR WATER-CLOSETS. — William Welch, John Coughlin, and John J. Mahoney, San Francisco, Cal.

271,569. BENCH-PLANE. — David A. Bridges, Vineland, N. J.

271,582. CEMENT AND CONCRETE PAVEMENT. — John W. McKnight, Washington, D. C.

SUMMARY OF THE WEEK.

Baltimore.

HOUSES. — W. F. Weber, architect, is preparing drawings for the following-named persons: —

W. L. Stork, Esq., 10 three-st'y brick buildings, with stone trimmings, cor. Charles and Third Sts., four of which will be 16' x 42', five 18' x 44', and one 20' x 46', and to cost $45,000.

Mr. Lautenbach, three-st'y and mansard brick building, with stone trimmings, n e cor. Eutaw and Saratoga Sts., 18' x 47', and to cost $7,000.

OFFICE-BUILDING. — Mr. Chas. L. Carson, architect, is preparing drawings for a two-st'y and mansard office-building for Messrs. T. J. and W. H. Shryock, cor. Union Dock and Eastern Ave. It will be of brick, with stone and terra-cotta trimmings, 25' x 50', and cost $8,000.

BUILDING PERMITS. — Since our last report eighteen permits have been granted, the more important of which are the following: —

Frederick Duker, 4 three-st'y brick buildings, e s Washington St., n e cor. of Federal St.

John Menshard, three-st'y brick building, n w cor. Fulton and Harlem Avenues.

Martin Marnell, three-story brick building, s s Eastern Ave., e of Gist St.

Henry Bowers, three-st'y brick building, n s Boyd St., between Arlington Avenue and Hollins Alley.

John N. Foss, 4 three-st'y brick buildings, w s Choptank St., s of Fairmount Ave.

B. F. Starr, three-st'y brick building, w s Bolton St., between Dolphin and Lanvale Sts.

Thos. Hetaffer, 10 two-st'y brick buildings, e s Monroe St., s of Pratt St.; and 4 two-st'y and basement brick buildings, Dover St., e of Monroe St.

Ferdinand Hahn, three-st'y brick building, n s Lombard St., between Calhoun St. and Norris Alley.

M. Freedman, three-st'y brick building, s s Pratt St., between Sharp and Howard Sts.

John Kern, Jr., & Co., two-story brick stable, w s Wicomico St., between Cross and Stockholm Sts.

E. W. Haviland, 17 three-st'y brick buildings, e s Mount St., between Winchester and Tennant Sts.

Louis C. McCusker, 3 two-st'y brick buildings, w s Shields Alley, n of Smith St.

Boston.

BUILDING PERMITS. — *Brick.* — *Old Harbor Point,* near Old Harbor St., Ward 24, for City of Boston, one-st'y hip stone filth-house, (hoist) 30' x 37'.

Wood. — *Highland St.*, near Centre St., Ward 21, for H. B. & L. M. Sargent, 3 three-st'y flat dwells., 20' x 38'; Richardson & Young, builders.

Highland St., near Centre St., Ward 21, for H. B. & L. M. Sargent, three-st'y flat dwell., 38' x 40'.

West Third St., No. 13, Ward 13, for John T. Schrefiel, one-st'y flat bakery and store, 21' x 31'; Chas. A. Gardner, builder.

Old Harbor Point Wharf, Ward 24, near Old Harbor St., for City of Boston, one-st'y flat storage of bricks, 22' 6" x 107'.

Old Harbor Point Wharf, Ward 24, for City of Boston, one-st'y flat blacksmith shop, 18' 6" x 31'; Charles R. Palmer, builder.

Old Harbor Point Wharf, Ward 24, for City of Boston, one-st'y flat stone-cutters' shed, 140' and 15' x 175'; Thomas Keyes, builder.

Central Ave., near Washington St., Ward 23, for Wm. E. Potter, one-st'y pitch dwell., 18' x 24'; John E. Crosby, builder.

Pratt St., near Linden St., Ward 25, for Isaac Pratt, Jr.; two-st'y pitch dwell., 20' and 26' x 30'; ell, 15' x 15'; W. B. Cameron, builder.

Cambridge St., near North Harvard St., Ward 25, for Patrick F. O'Keefe, one-st'y pitch mechanical, 25' x 50'; James Green, builder.

Dorchester Ave., cor. Unnamed St., Ward 24, for Mary A. Jones, 3 three-st'y flat dwells. and stores, 50' x 20' 10".

Dorchester Ave., near Commercial St., Ward 24, for Patrick Rogers, two-st'y flat dwell. and store, 30' x 40'.

Brooklyn.

BUILDING PERMITS. — *North Seventh St., No.* 258, s s, 150' e Sixth St., four-st'y frame double tenement, tin roof; cost, $5,000; owner, C. H. Meyer, on premises; architect, T. Engelhardt; builders, U. Maurer and M. Metzen.

Dupont St., n w cor. Oakland Ave., three-st'y frame tenement, gravel roof; cost, $4,600; owner, G. H. Meyer, Dupont St., n e cor. Oakland Ave.; architect, F. Weber; builders, M. Vogel and A. Lang.

Bedford Ave., e s, 20' s Lexington Ave., extending 80'; also, Bedford Ave., e s, extending from Clifton Pl. to Greene Ave.; also, Bedford Ave., e s, extending from Greene Ave. to Lexington Ave., 12 four-st'y brownstone front double stores and tenements, gravel roofs; cost, each, about $15,000; owner, Thomas H. Brush, 74 Fourth Ave.; architect, F. E. Lockwood.

Nostrand Ave., e s, 100' s Monroe St., four-st'y brownstone front tenement, gravel roof; cost, $4,500; owner, architect and builder, G. W. Brown, 728 Fulton St.

Eckford St., w s, 71' s Nassau Ave., 3 three-st'y frame tenements, gravel roofs; cost, each, $4,000; owner, John Englis, 110 Kent St.; architect, F. Weber; builders, G. P. Roberts and T. Randall.

On pier near foot of Joralemon St., one-story frame shed, gravel roof; cost, about $12,000; owners, Cashman & Co.; architect, T. Reed; builder, V. Loser.

Willoughby Ave., s s, 395' w Marcy Ave., 5 two-st'y and basement, with three-st'y rear, brownstone front dwells., tin roofs; cost, each $5,500; owner, architect and builder, Arthur Taylor, 861 Myrtle Ave.

Central Ave., s w cor. Jefferson St., three-st'y frame tenement, tin roof; cost, $6,000; owner, Henry Eppig, 101 Evergreen Ave.; architect, G. Hillenbrand; builders, W. Bayer and J. Rueger.

Leonard St., e s, 33' 4" s Nassau Ave., 2 three-st'y frame tenements, gravel roofs; cost, each, $3,500; owner, John Englis, 110 Kent St.; architect, F. Weber; builders, G. P. Roberts and T. Randall.

Green St., n s, between Franklin St. and Manhattan Ave., one-st'y brick stable, gravel roof, iron cornice; cost, $4,200; owners, B. C. R. R. Co., 10 Fulton St.; architect, A. W. Dickie; builders, J. Ashfield & Son.

Prospect Ave., n s, 150' w Seventh Ave., three-st'y frame double tenement, tin roof; cost, $3,800; owner, H. J. Hoff, Prospect Ave.; architect, W. H. Wirth; builders, G. Buchanan and C. A. Gildersleeve.

Second Ave., w s, 50' s Fifty-fourth St., three-st'y frame dwell., with two-st'y extension; cost, $2,475; owner, Thomas O'Connell, 153 Henry St., New York City; architect and builder, H. J. Skinner.

Waverly Ave., w s, 186' 8" s Lafayette Ave., two-st'y brick stable, tin roof; cost, $6,000; owner, Wm. H. Hill, 450 Washington Ave.; architect, G. L. Morse.

Central Ave., n w cor. Stanhope St., three-st'y frame double tenement, tin roof; cost, $4,800; owner, —— Bressler, Park Ave., cor. Throop Ave.; architect, J. Hillenbrand; builders, E. Loerch and J. Rueger.

Walton St., No. 81, s s, 77' w Harrison Ave., three-st'y frame tenement, tin roof; cost, $3,500; owner, Chas. Scheidt, 155 Harrison Ave.; architect, T. Engelhardt; builders, U. Maurer and J. Frey.

Maujer St., No. 106, s s, 200' from Ewen St., three-st'y frame tenement, tin roof; cost, $4,500; owner, Friedrich Schaufler, on premises; architect, A. Herbert; builders, J. Schereth and C. Wieber.

ALTERATIONS. — *Forrest St.*, n s, 125' e Bushwick Ave., one-st'y brick extension, tin roof; cost, $3,500; owner, Claus Lipsius, Bushwick Ave., cor. Forrest St.; architect, C. Stoll; builders, H. Grassman and J. Rueger.

Clymer St., No. 169, four-st'y brick extension, gravel roof; cost, $3,000; owner, A. C. Washington, 62 Bedford Ave.; builders, M. Singer and J. Biron.

Buffalo, N. Y.

CONTRACTS. — The contracts for steam-heating and plumbing work of the Young Men's Christian Association Building have been let to Messrs. Irlbacker & Davis and Mr. Jno. D. Smith, for the sums of $5,600 and $1,000 respectively.

OPERA-HOUSE. — Mention has not been made, I think, of the new opera-house of Messrs. Wahle, on Court St. Building is of brick, with cut-stone and galvanized-iron trimmings; cost, $65,000.

MILL. — Addition to the planing-mill of Lee, Holland & Co., Court St.; cost, $10,000.

ROUND-HOUSE. — Round-house for the Nickel Plate Railroad, South Buffalo; cost, $25,000.

STORES. — Brick block, Carroll St.; cost, $10,000; owner, John Bush.

Alterations to store on Main St., for Austin estate; cost, $3,000.

Chicago.

HOUSES. — On the cor. of Loomis and Congress Sts. has been commenced a three-st'y brick dwell., 60' x 125', to be built in flats at a cost of $32,000; Mrs. B. Naghton, owner; H. Rehwoldt, architect; and John Dunphy, builder.

B. W. S. Clark, architect, has prepared plans for a block of nine dwelling-houses, to be built on Wabash Ave., near Thirty-fifth St.; cost, $130,000.

The same architect has completed plans for a dwelling-house in Queen Anne style, for F. A. Adams, to be built at Englewood, a suburb of Chicago.

Plans are prepared by Mr. Clark for a $10,000 residence, to be built near Topeka, Kan; also, plans for an $8,000 residence for Mr. T. Williams, at Oak Park, a Chicago suburb.

STORES. — Plans are completed by Mr. B. W. S. Clark for a block of stores on State St., near Sixteenth St., to be five stories and basement, 50' x 150'; for Allen Bros.; cost, $60,000.

Also plans for a block of stores and flats on West Jackson St.; cost, $20,000.

RIDING-SCHOOL BUILDING. — The Union Riding Club have let the contracts for a riding-school building on North Clark St., between Goethe and Schiller Sts. The structure will be of pressed brick with stone finish, and the track in the interior will be capable of accommodating twenty-four horses. The building will be 72' x 152', two-st'y, and cost $22,000; Cudell & Blumenthal, architects.

BUILDING PERMITS. — E. C. Chambers, one-st'y brick cottage, 21' x 30', 1236 Adams St.; cost, $1,000.

Poths & Co., four-st'y brick factory, 40' x 80', Weed St., cor. Dayton; cost, $6,000.

S. E. Gross, 3 one-st'y cottages, 20' x 32' each; Illinois Ave., near Thirty-second St.; cost, $8,000.

Anton Schmidt, one-st'y brick cottage, 20' x 50', 743 Hinman St.; cost, $1,000.

M. Mountosky, two-st'y brick dwell., 21' x 45', 10 Luce St.; cost, $2,200.

F. C. Runing, two-st'y brick flats, 21' x 41', 451 West Erie St.; cost, $2,600.

P. Iverson, one-st'y brick basement, 20' x 30', 30 Bismarck St.; cost, $1,000.

E. B. McCagg, additional st'y, 40' x 48', 67 Cass St.; cost, $6,000.

A. B. Olson, two-st'y and basement brick flats, 21' x 48', 276 Lincoln St.; cost, $4,000.

F. C. Heath, three-st'y brick flats, 27' x 60', 2808 South Park Ave.; cost, $7,000.

Aug. Hernowski, one-st'y brick cottage, 20' x 36', 80 Hastings St.; cost, $1,000.

Chas. Bepp, three-st'y and basement brick store and flats, 24' x 70', 30 West Indiana St.; cost, $9,000.

Mrs. B. Naghton, three-st'y brick dwell., 60' x 125', Loomis and Congress Sts.; cost, $32,000.

G. Hafner, three-st'y brick flats, 220 Maxwell St.; cost, $4,500.

G. Hafner, two-st'y attic brick flats, No. 10 O'Brien St.; cost, $2,400.

Schills & Cassman, four-st'y and basement brick store, Mather and Clinton Sts.; cost, $17,000.

James Touldon, two-st'y and basement brick flats, No. 150 Cornelia St.; cost, $2,500.

Geo. Hensen, three-st'y brick store and dwell., 1462 Lake St.; cost, $2,500.

W. D. Kerfoot & Co., agents, 10 one-st'y cottages 20' x 50' each, Rice St., near Robey St.; cost, $18,000.

New York.

THEATRE. — The Bijou Theatre is to be entirely remodelled, the floor lowered, the roof raised, and probably a new front built, from designs of Messrs. Smith & Kelly.

STORES. — A fine store, about 98' x 130', is to be built on the s w cor. of Broadway and Fourth Sts., from designs of Mr. Henry Fernbach.

Two stores, about 50' x 50', five stories high, of brick with Wyoming Valley bluestone finish are to be built at Nos. 164 and 165 West St., for Mr. W. R. Renwick from designs of Mr. Geo. Martin Huss.

STABLE. — Mr. A. C. Clark proposes to build a large livery-stable on the north side of Seventy-fifth St., between Broadway and Tenth Ave.

ALTERATIONS. — Nos. 917 to 925 Park Ave. are to be altered from tenement-houses into first-class flats, and No. 80 East Fifty-fourth St. from a residence to an apartment-house, all for Messrs. Robert & Ogden Goelet, from designs of Mr. Jos. M. Dunn.

No. 28 West St., is to be altered so that the basement can be used for store purposes. Mr. H. Edwards Ficken is the architect.

BUILDING PERMITS. — *Canal St., No.* 332, *and Ispenard St., Nos.* 39 *and* 41, six-st'y brick and iron front store, tin roof; cost, $75,000; owner, John Clark, 340 Canal St.; architect, Jobst Hoffmann.

One Hundred and Forty-third St., n s, 181' e of Alexander Ave., two-st'y frame dwell., tin roof; cost $3,000; owner, Wm. Gallagher, One Hundred and Sixty-second St., bet. Courtland and Elton Aves.; architect, H. S. Baker.

One Hundred and Fifteenth St., s s, 245' w of Fifth Ave., 5 three-st'y brownstone front dwells., tin roofs; cost, each $15,000; owners, Jas. Madden, 2153 Second Ave., and James Mara, 2165 Second Ave.

Canal St., No. 276, four-st'y brick store, tin roof; cost, $8,000; owner, C. W. Bruce; architect, John B. Snook; builders, John Demarest and Wm. A. Vanderhoof.

Canal St., Nos. 329 *and* 331, *and Greene St., No.* 6, six-st'y brick store, tin roof; cost, $75,000; owners, Lorillard Spencer and others, per James M. Jackson, 3 Mercer St.; architect, John B. Snook; builders, Robinson & Wallace, and W. Gerard & Co.

Third Ave., Nos. 443, 445 *and* 447, *and* 206 *East Thirty-first St.*, three-st'y brick theatre; cost, $50,000; owner, Annie L. McCahill, Larchmont, N. J.; architect, Alfred Chamberlain.

One Hundred and Forty-sixth St., s s, 500' e Tenth Ave., 8 two-st'y brick and frame dwells., gravel roofs; cost, each $1,500; owner, Wm. Thompson, 53 Leonard St.; architect, T. M. Clark.

East Twenty-third St., Nos. 156 *and* 158, four-st'y brick stable and coach-house, gravel roof; cost, $10,000; owner, Anton Markert, 28 Lexington Ave.; architect, Fred Jenth; builder, H. Westphal.

Fifty-ninth St., s s, 120' e Sixth Ave., 2 nine-st'y brick and stone flats, tin and slate roofs; cost, each, $300,000; owner, Geo. Munro, 15 West Fifty-seventh

St.; architect, John Correja; builders, R. L. Darragh and McGuire & Sloan.

Railroad Ave., w s, 132′ n One Hundred and Sixty-seventh St., two-story frame factory, gravel roof; cost, $2,500; owner, Julius Brunner, on premises; builder, Louis Falk.

Third Ave., w s, 139′ 2″ n One Hundred and Fourteenth St., five-st'y brick tenement and store, tin roof; cost, $15,000; owner, D. G. Crosby, 64 West Ninth St.; architects, D. & J. Jardine; builder, Ed. Kilpatrick.

Second Ave., n e cor. Sixty-third St., five-st'y brownstone front flat and store, tin roof; cost, $16,600; owners, Graham & Connor, 211 East Thirty-fifth St.; architect, John C. Burne; builders, Graham & Connor.

Second Ave., e s, 20′ 5″ n Sixty-third St., 3 five-st'y brownstone front flats and stores, tin roofs; cost, each, $18,000; owners, builders and architects, same as last.

Sixty-third St., n s, 80′ e Second Ave., 5 five-st'y brick tenements, tin roofs; cost, each, $20,000; owners, builders and architects, same as last.

Seventy-eighth St., n s, 50′ e Third Ave., 9 one-st'y brick stores, gravel roofs; cost, each, $1,500; lessee, Bernard Ehrenreich, n w cor. Lexington Ave. and Sixty-fifth St.; architect, John Brandt.

First Ave., *No.* 2306, four-st'y brick tenement and store, tin roof; cost, $15,000; owner, Teresa Coogan, 422 East One Hundred and Fifteenth St.; architects, Cleverdon & Putzel.

Forty-third St., s s, 80′ e of Third Ave., five-st'y brick tenement, tin roof; cost, $12,000; owner, John Murphy, 249 East Forty-ninth St.; architects, Babcock & McAvoy; builder, not selected.

Thirty-eighth St., n s, 125′ w of First Ave., 4 five-st'y brick tenements, tin roofs; cost, each $16,000; owner, John J. McDonald, 1321 Park Ave.; architect, John Brandt.

Alterations. — *West St.*, n e cor. Beach St., internal alterations; cost, $5,000; owners, Old Dominion Steamship Co., cor. Fulton and Greenwich Sts.; architect, Wm. Rowland; builder, Wm. Shapter.

Sixth Ave., *Nos.* 431 *to* 435, build new wall on northerly line and a one-st'y brick extension; cost, $2,000; owner, Ed. B. Simon, exr., 63 East Fifty-ninth St.; architect, John B. Franklin.

One Hundred and Fourth St., n s, 160′ w Ave. A, raise one st'y, etc.; cost, $5,000; owner, F. H. Duclos, N. J.; architect, Aug. Hatfield; builder, T. W. Banks.

Greenwich Ave., *No.* 27, raise one st'y, new flat roof; cost, $3,000; owner, Dietrich Fink, 106 West Washington Pl.; builder, John Jordan.

East Eighteenth St., *No.* 405, three-st'y brick extension, new front; cost, $7,000; owner, John Bickman, 302 First Ave.; architect, F. W. Klemt.

Ave. A, s e cor. Eighty-sixth St., two-st'y brick extension, new store front, etc.; cost, $3,000; owner, Henry W. Neumann, on premises; architect, John Brandt.

West Thirty-second St., *Nos.* 147 *and* 149, raise extension to No. 147 one-st'y, main building of No. 149 extended 8′, and a new two-st'y extension; cost, $10,000; owner, Benedict Fischer, 366 West Fifty-seventh St.; architects, Thom & Wilson.

Allen St., *No.* 13, three-st'y brick extension; cost, $3,000; lessee, Fred. J. Selig, on premises; builder, Jno. Derr.

East Twenty-ninth St., *No.* 129, four-st'y brick extension and internal alterations; cost, $6,000; owner, Daniel E. McSweeney, on premises; architect, R. W. Buckley.

Seventh Ave., s w cor. Fifty-seventh St., repair damage by fire; cost, $15,250; owner, Wm. Noble, 926 Park Ave.

Sixth Ave., *No.* 441, one-st'y brick extension; cost, $3,000; owner, estate of Sylvester Brush, 31 Nassau St.; architect, Henry Fernbach.

Broadway, *No.* 335, *and Worth St.*, *Nos.* 87, 89 *and* 91, repair damage by fire; cost, $7,300; owners, Cora and Myra Moffatt, No. 6 East Forty-eighth St.; builder, Henry Wallace.

Fifth Ave., *No.* 327, basement and first st'y fitted up for business purposes, new store front; cost, $4,000; owner, John J. Astor, 21 West Twenty-sixth St.; builders, Jas. Webb & Son and John Downey.

Broadway, *Nos.* 503 *to* 511, raise one-st'y; cost, $25,000; owner, Jos. F. Loubat, 156 Fifth Ave.; architect, Jno. B. Snook; builder, not selected.

Sixty-fourth St., s s, 250′ e Eastern Boulevard, raise three stories; cost, $12,000; owners, Neidlinger, Schmitt & Co., on premises; builders, J. & L. Weber.

West Fourteenth St., *No.* 504, one-st'y brick extension; cost, $3,000; lessee, Campbell Mining and Reducing Co.; builders, Samuel Lowden and John Farrell.

Philadelphia.

Building done during the Month of January. — The building operations in the city during the month of January have been unusually light. This is shown by the applications for permission to erect new and alter old buildings made at the office of the Building Inspectors. These officials issued but 61 permits during the month, being just half the number given for the corresponding month last year. The aggregate was made up as follows: — Alterations and additions, 22; back buildings, 10; two-st'y dwells., 11; three-st'y dwells., 3; factories, 2; stables, 5; foundries, 3; and mission building, office, dye-house, church, and mill, each 1.

Store. — At No. 418 Arch St., Thomas Potter, Sons & Co. propose to erect a four-st'y brick store, 27′ x 200′.

Building Permits. — *Lombard St.*, s s, w Twenty-fifth St., one-st'y stable, 48′ x 77′; H. T. Snpplee, contractor.

Cedar St., s s, w of Manayunk Ave., three-st'y dwell., 18′ x 47′; J. F. Peasgood, owner.

South Nineteenth St., *No.* 726, three-st'y dwell., 17′ x 26′; J. P. Lamberton, owner.

Setters St., *Nos.* 133 *to* 137, 3 two-st'y dwells., 16′ x 40′; Chas. G. Gilmore, contractor.

Coral St., n w cor. Taylor St., rebuilding factory, 47′ x 110′; Wm. Arnott, owner.

Front St., e s, s of Girard Ave., one-st'y storehouse, 100′ x 130′; M. Magee, contractor.

West College Ave., *No.* 1248, addition to soap works, 18′ x 70′; W. Chambers, owner.

Garfield St., n s, w of Wakefield St., two-st'y dwell., 16′ x 44′; Wm. Garvin, contractor.

Hancock St., e s, n of Cumberland St., two-st'y building, 17′ x 18′; Daniel Nevling, contractor.

Manayunk Ave., w of Cedar St., three-st'y dwell., 18′ x 47′; Robert Boon, owner.

Bringhurst St., w of Wakefield St., 2 two-st'y dwells., and two-st'y stable, 15′ x 32′ and 16′ x 20′; John Rufe, owner.

Dock St., *No.* 120, three-st'y store, 18′ x 80′; C. H. Jacoby, owner.

Leithgow St., n of Norris St., two-st'y dwell., 16′ x 20′; Felix Boltz, owner.

Thirteenth St., s of Locust St., three-st'y dwell., and four st'y dwell., 18′ x 82′ and 22′ x 82′; Robertson & Bryan, contractors.

Centre St., n s, w of Schaeffer St., 4 three-st'y dwells., 16′ x 25′; Wm. Garvin, contractor.

Broad St., e s, 64′ n of Ellsworth St., two-st'y store and dwell., 21′ x 61′; E. Benson, owner.

St. Louis.

Building Permits. — Seventeen permits have been issued since our last report, seven of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

H. Tiemann, 2 adjacent two-st'y brick dwells.; cost, $6,500; Wm. Springmeyer, contractor.

Peter Sarvies, two-st'y brick dwell.; cost, $4,000; contract sub-let.

PROPOSALS.

IRON-WORK. [At Boston, Mass.]

Office of Supervising Architect, Treasury Department, Washington, D. C., February 8, 1883.

Sealed proposals will be received at this office **until 12 m., on the 28th day of February, 1883,** for furnishing and fixing in place complete in the post-office and sub-treasury extension-building at Boston, Mass., the iron-work of post-office screens, stairways, railings, floor-lights, in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the superintendent.

JAS. G. HILL, Supervising Architect.

374

BRICK, CEMENT, ETC. [At Buffalo, N. Y.]

Sealed proposals will be received at the Park Commissioners' office, City Hall, Buffalo, N. Y., for furnishing the materials hereunder mentioned, to be used in the construction of the Buffalo Trunk Sewer, **until 12 o'clock m., on Wednesday, the 14th day of February, 1883,** and opened immediately thereafter.

The materials required are as follows:

Sewer bricks, not to exceed 20,000,000.

American hydraulic cement, not to exceed 50,000 barrels.

Portland cement, not to exceed 10,000 barrels.

Iron castings, not to exceed 100,000 pounds.

Dated 24th of January, 1883.

The Board of Sewer Commissioners of the City of Buffalo, per 373 D. C. BEARD, Chairman.

MOVABLE DAM. [At Louisville, Ky.]

U. S. Engineer Office, 82 West Third St., Cincinnati, O., January 12, 1883.

Sealed proposals in duplicate will be received at this office, **until 12 o'clock, noon, on Thursday, the 1st day of March, 1883,** for the construction of the parts necessary for 200 feet of movable dam, and the delivery of the same at Louisville, Ky.

Approximate quantities: Wrought-iron, 28,000 pounds; cast-iron, 2,500 pounds; malleable-iron, 850 pounds; dressed white-pine, 1,260 feet, B. M.; dressed white-oak, 400 feet, B. M.

Specifications and all necessary information can be obtained by application to the undersigned.

WM. E. MERRILL, Major of Engineers.

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COUNTY COURT-HOUSE. [At Mount Ayr, Io.]

Drawings can be seen after February 10th at the office of the County Auditor, at Mt. Ayr, Ringgold Co., Iowa, or at the office of Eckel & Mann, architects, St. Joseph, Mo.

Sealed bids must be in by **March 1, 1883.**

The Supervisors reserve the right to reject any or all bids.

By order of the Board.

T. A. STEVENSON, Chairman.

J. E. DOZE, County Auditor. 373

DAM. [At Louisville, Ky.]

U. S. Engineer Office, 82 West Third St., Cincinnati, O., January 12, 1883.

Sealed proposals, in duplicate, will be received at this office **until 12 o'clock, noon, on Thursday, the 1st day of March, 1883,** for the construction of the parts necessary for 200 ft. of movable dam, and the delivery of the same at Louisville, Ky.

Approximate quantities: wrought-iron, 28,000 lbs.; cast-iron, 2,500 lbs.; malleable iron, 850 lbs.; dressed white-pine, 1,260 feet B. M.; dressed white-oak, 400 feet, B. M.

Specifications and all necessary information can be obtained by application to the undersigned.

374 WM. E. MERRILL, Maj. of Engineers.

COURT-HOUSE. [At Caledonia, Minn.]

Sealed proposals will be received by the Building Committee of the County Commissioners of Houston County, Minnesota, **until March 21, 1883,** at the office of the Auditor in Caledonia, for the construction of a stone Court-House for said County, according to plans and specifications of same now on file at the Auditor's Office, and at the office of the architects, C. G. Maybury & Son, Winona, Minn., who will give any further information desired. No bids will be received except for the whole building complete as specified. The successful bidder will be required to give bonds in the sum of $5,000. The right to reject any and all bids is reserved. By order of Building Committee.

376 E. K. BOVERUD, County Auditor.

PROPOSALS.

HARDWARE. [At Philadelphia, Pa.]

Office of Supervising Architect, Treasury Department, Washington, D. C., February 5, 1883.

Sealed proposals will be received at this office **until 12 m., on the 26th day of February, 1883,** for furnishing and delivering at the Treasury Building, Washington, D. C., all the hardware required for the Court-House and Post-Office at Philadelphia, Pa., in accordance with specification and schedule, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL, Supervising Architect.

373

SCHOOL-HOUSE. [At Brattleboro, Vt.]

Brattleboro, Vt., January 19, 1883.

The plans and specifications of a two-st'y brick school-house, 96′ x 124′, will be open for inspection after January 30, at the office of Haskins & Stoddard, Brattleboro, Vt. Bids for constructing the same in a thorough and substantial manner will be received by the undersigned **up to 12 m., February 20, 1883.** Bids may be made for building the house as a whole, or in parts, to wit: For the basement or foundation story, with necessary excavations; for the mason-work, for carpenter-work and painting; for heating and plumbing. The successful contractor will be required to give sufficient bonds to insure a faithful compliance with their contract. The committee reserve the right to reject any or all bids as they may deem best for the interest of the district.

H. D. HOLTON, WM. H. COLLINS, E. W. STODDARD, JACOB ESTEY, GEO. A. HINES. } Building Committee.

373

PLASTERING. [At Topeka, Kans.]

Office of Supervising Architect, Treasury Department, Washington, D. C., February 12, 1883.

Sealed proposals will be received at this office **until 12 m., on the 7th day of March, 1883,** for all the plastering required in the Court-House and Post-Office at Topeka, Kans., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office, or the office of the Superintendent. JAS. G. HILL,

373 Supervising Architect.

IRON WATER-PIPES. [At Providence, R. I.]

Office of Board of Public Works, City Hall, Providence, R. I., February 13, 1883.

Sealed proposals will be received at this office **until 11 o'clock a. m., Friday, February 23d, 1883,** for furnishing the following sizes of cast-iron water-pipes.

Five tons, of 2,240 pounds, 4 inches in diameter.

Four hundred and fifty tons, of 2,240 pounds, 6 inches in diameter.

Eighty tons of 2,240 pounds, 8 inches in diameter.

To be delivered on wharf in this city.

The delivery to commence on or before May 1st, and to be completed on or before August 1st, 1883.

A bond satisfactory to the Board, in the sum of five hundred dollars, as liquidated damages, for failure to execute the contract within ten days, if awarded, will be required of each bidder, and a satisfactory bond in the sum of twenty-five hundred dollars conditioned upon the faithful fulfilment of the contract, will be required of the successful bidder.

Specifications and forms of contract, and of proposals may be obtained on application at this office.

The Board reserves the right to reject any or all proposals.

SAMUEL B. SWAN, CHARLES ANTHONY, SAMUEL M. GRAY, } Board of Public Works.

373 City Engineer.

IRON FURRING AND LATHING, ALSO FIRE-PROOF COVERING FOR IRON COLUMNS. [At Topeka, Kans.]

Sealed proposals will be received at this office **until 12 m., on the 24th day of February, 1883,** for furnishing and fixing in place, complete, all the iron furring and lathing, also the fire-proof covering for the iron columns, required for the Court-House and Post-Office at Topeka, Kansas, in accordance with drawings and specifications, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

JAS. G. HILL,

373 Supervising Architect.

SEWER. [At Buffalo, N. Y.]

Sealed proposals will be received at the Park Commissioners' office, City Hall, Buffalo, N. Y., for executing the work hereunder mentioned, the same being the construction of the Buffalo Trunk Sewer, **until 12 o'clock m., on Tuesday, the 20th day of February, 1883,** and opened immediately thereafter.

The work to be done is as follows:

The construction of a trunk sewer from Albany Street to the intersection of the Mill Race sewer in Seneca Street at Hydraulic Street, being a total length of less than 24,000 feet.

Also, flushing inlets from the main and Hamburg canal, and the Erie canal, and the interception of existing sewers which now deliver into these canals, together with all minor appurtenances of the work.

The diameter of the main sewer throughout the principal part of its length will be 8 feet.

About 2,600 feet of the sewer will be built in tunnel.

The estimated quantity of brick to be laid is about 20,000,000.

Plans and specifications for the work, as soon as completed, may be seen at the office above stated.

Dated 24th of January, 1883.

The Board of Sewer Commissioners of the City of Buffalo, per 373 D. C. BEARD, Chairman.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE Boston Manufacturers' Mutual Fire Insurance Company has issued a circular written by its President, Mr. Edward Atkinson, again calling attention to the method for protecting city warehouses from fire which was first described in a report published in 1880, and further illustrated in a lecture delivered by Mr. Atkinson not long afterwards. Most of our readers are probably familiar with the main features of the plan, which consists in placing stand-pipes at the corners of the blocks in the business quarter of large towns, with horizontal pipes on the roofs, carried around the block, and fitted with hydrants on each side of each party-wall, so that every building in the block can, by means of power applied at either stand-pipe, be flooded with water from at least two points, and many streams may be directed from the roofs against a fire on the opposite side of any of the surrounding streets. The very simplicity of this plan prevents it from making the impression on the imagination of the casual reader which it does on the mind of the expert, and it is worth while to study more closely the effect which, if carried out, it would have upon the practice of controlling fires in the dry-goods district of New York, where Mr. Atkinson suggests that it might well be first applied. At present, when a fire occurs in that region, or at least in all but the most modern portions of it, the first step is to sound the alarm and summon the engines. While they are threading their way through the immense concourse of trucks and other vehicles which obstruct all the streets in that quarter during the daytime, the fire climbs the hoist-way, or runs up behind the furrings of the front and rear walls, to the upper loft, which is usually filled with empty cases, samples and scraps of all descriptions, and by the time the first engine reaches the ground, the highest story is in a roaring blaze. The next step is to attach the engine-hose to a street hydrant, in which there is now during much of the daytime, according to a recent report of the underwriters, no pressure whatever. To reach the worst part of the fire, therefore, the engine must pump water from the hydrant and throw it to the top of the burning store, which is probably from seventy-five to eighty feet above the street. This is a matter of no small difficulty, and even if the attempt is successful, the stream can only be thrown in fine spray a short distance through the front windows, leaving the rear portion of the structure to burn unmolested until hose can be dragged up through the stairways of the opposite building, or patent ladders can be brought up from some distant station. While all this is going on, the fire is quite at liberty to spread through the other stories, and the water, thrown in continuous streams into the upper windows, with no particular aim, runs in rivers over the floor, soon to soak through and destroy what goods in the lower stories the flames may have spared.

BY the new system the method of procedure would be very different. Instead of dragging hose hither and thither, by connecting any of the stand-pipes the lines on the roof could be immediately filled with water from end to end, and any number of streams directed, not at random into the nearest window, but through skylights or holes cut in the roof, with perfect precision upon the heap of goods, or pile of packing-cases, or elevator-shaft or stairway, that happened to be burning. A two-inch stream of water would make short work of fire where it fell, and all combustion in the upper story being quenched by direct attack, the same process could be extended to the story below, with the greatest possible effect from the use of the smallest possible quantity of water. This mode of dealing with a conflagration is by no means new. Long ago it was acknowledged that fires in city warehouses could be attacked with far greater efficiency from above than from below, and hundreds of party walls are now carried up six feet or so above the roofs on each side, and provided with glazed loop-holes, through which the firemen can see to direct a stream from a hose-nozzle, without being scorched by the heat. The only difficulty in using these protections for their intended purpose lies in the fact that at present it would be almost impossible to get water to them in time to do any good with it, and at best, without the aid of some comprehensive system of pipes like that which Mr. Atkinson proposes, defensive works on the roofs of buildings must be very slow in preparing for action, and comparatively ineffective in operation.

TO the original plan for constructing and arranging the stand and roof pipes, Mr. Atkinson now adds a detail of great importance. Observing the steadiness and reliability of the supply of force available from the public steam-heat and power companies, he proposes that instead of depending upon the tardy and inadequate assistance of the fire-engines for filling the pipes, steam-pumps, supplied with motive force from the great companies, or, if necessary, from special boilers, should be placed in convenient stations, at the rate of about two to each block, under the charge of competent men, who would, at a moment's warning, which might be given, if necessary, by automatic signal, fill the whole system of pipes, ready to be used as the proper officer might direct. To avoid the possibility of failure or deficiency in the city supply, wells might be driven in various places, which would, as experience in the dry-goods district shows, furnish an ample quantity of water without resorting to the Croton mains; and many, if not all, the pumps and pipes which were established for fire service might be utilized at all times for supplying water to the hydraulic elevators which are rapidly multiplying in the district. Notwithstanding the great and obvious value of such a system as this, there must be difficulty in obtaining that unanimity of feeling among property-owners which would secure its adoption, except on a very limited scale, as a means for mutual protection, and Mr. Atkinson suggests that it might be best introduced either by one of the New York steam-supply companies as a branch of their own business, or by a special protective fire-insurance company, which could, by an expenditure of perhaps seventy-five thousand dollars per annum, establish pumps, wells and pipes, and maintain an effective service night and day throughout the dry-goods district, containing not far from five hundred million dollars' worth of property, on which at least a million and a half dollars is paid annually as premiums for insurance. Independent of earnings by supplying water for elevators and other purposes, such a protective insurance company would rely for its profits upon the reduction effected by its safeguards in the risks upon property which it insured. At present, with premiums amounting to one and one-half million, the losses average more than a million dollars a year, these, with the expenses, consuming all the premiums paid. If, then, the new company, retaining the same rates of premium which are now found unremunerative, and are likely to be materially raised before long, could secure control of the insurance business of the district, at the same time reducing by its appliances the risk of loss from fire to the amount of one-tenth, its annual net profits would be one hundred and fifty thousand dollars, after wages and interest on its plant had been paid. How the necessary control of the insurance of the district would be obtained we will not attempt to say, but that the saving in risk from fire by such appliances as Mr. Atkinson describes, and by other precautions which could easily be made obligatory on the insured, would be very much more than one-tenth, no architect needs to be told. In fact, already, under the care of members of our profession, stand-pipes have been erected in front of many of the newer buildings in the dry-goods district, elevator-wells have been enclosed with brick walls and tin-covered doors,

ceilings wired to prevent the fall of the plaster, and other precautions taken which, although much less effective under present circumstances than they would be if combined with an efficient and general protective service, certainly add one-tenth to the security of the structure, and are of value, not only for themselves, but as showing the disposition which has arisen among owners of buildings to second any insurance company which may undertake to initiate a reform.

ONE of the latest orders of the New York Inspector of Buildings, which has caused considerable comment among the general public, directs that the beautiful new Casino Theatre on Broadway shall be furnished forthwith with iron balconies and ladders on both the Broadway and Thirty-ninth Street fronts. The Broadway balconies are to be eighteen feet long, and as one is to be placed at each story they will, with their ladders, form a somewhat striking addition to the design of the façade. According to Mr. Esterbrook's letter, giving the order, a promise had already been made that fire-escapes should be placed on the building, but the fulfilment of the promise being, as he judged, unreasonably delayed, he thought proper himself to provide for the matter, and in order to hasten the execution of his directions he appended to his missive an order to suspend the performances in the theatre until they were complied with. The architects, as well as the proprietor of the theatre, naturally felt that this public action cast a reflection upon the security of their building, which was designed to be exceptionally safe against all possible accident from fire, but it is unnecessary to say that the Inspector is obliged to judge of the need by circumstances as he finds them, and the structure being yet very incomplete, the temporary timbering with which a considerable portion of it is filled adds much to a danger which will probably be inconsiderable when the work is carried out as intended.

A DISCUSSION is going on in Boston in regard to the danger from fire to the occupants of the older college buildings at Cambridge, and quite a panic is reported to exist among the more timid students. It is certain that the most ancient buildings on the ground are very ill-planned for enabling the persons who live in the rooms to escape if the wooden stairways, which form the only means of access to them, should take fire, but they are not very high, and an improvised rope of sheets and blankets would probably serve to conduct the students of the day safely to the ground in case of danger, in much the same way that a similar contrivance used to aid their predecessors in enterprises which did not involve their preservation from death. In fact, the government of the college, relying upon the athletic habits of the undergraduates, is said already to contemplate the introduction of ropes into the rooms in the upper stories, to be attached to the window-sills ready for use, and this idea meets with much commendation from the outside public, as, we doubt not, it does from the students themselves, to many of whom the relief which the ropes will afford from the prosaic mode of going up and down stairs to their rooms will be grateful, even at times when there is no fire to be dreaded; while the facilities gained by the same means for paying unexpected visits to neighbors will be highly appreciated. The college has certainly been fortunate in respect to conflagrations, not a single life having been lost by fire for two hundred years, although the upper portion of several of the buildings has been burned off; and under the very favorable circumstances of constant surveillance, proximity to the city stations, and great subdivision of space, the dormitories are likely to remain substantially uninjured, at least from that cause, for centuries more.

THE inquest into the causes of the fall of the factory chimney at Bradford, England, by which a large number of persons were killed, has resulted in a verdict exonerating the owners of the property from all blame. The failure of the chimney, in the opinion of the jury, was caused by the cutting out of the joints for the purpose of straightening it, although this would not probably have been fatal except for the high wind which prevailed. It seems from the evidence that the chimney was built double, but with a certain want of connection between the outer and inner shells. Not long before the accident serious cracks were observed in the outer casing, and finally this began to bulge out, although the inner shell appeared sound. It was then decided to cut into the shaft, in order to bring back the whole mass to the proper line, and the stone-work was sawed entirely through in two places, about three feet apart. The witnesses believed that upon the withdrawal of the wedges which held the work during the cutting, the weight above, amounting to about seven tons to the square foot, was suddenly brought upon a comparatively small section of the wall, and that the high wind which prevailed afterwards rocked the upper portion of the shaft upon its inadequate bed, crushing and pounding the stone below it, and between the two cuttings, until its resistance was overcome. In support of this theory it was shown that the chimney, instead of being drawn over fifteen inches by the two cuts, each one-half inch in width, which would be the calculated change in position, actually shifted its place three feet, showing that some crushing must have taken place immediately upon the removal of the wedges, and the vibration caused by the wind might easily complete the disintegration.

THE Trustees of the Metropolitan Museum of Art presented at the annual meeting of the members, held a few days ago, a very satisfactory report, showing that the Museum is now not only free from debt, but that the value of its property has been steadily increasing, while its income during the past year was sufficient to meet the current expenses. The Trustees find, however, that the business of the Museum has increased so largely as to require a corresponding increase in the number of persons employed, and twenty-two are now found insufficient to do the work which was done ten years ago by four. To assist the Director of the Museum a Curator has been appointed, — Mr. W. H. Goodyear, — and the Trustees think that before long separate officers, subordinate to the Director, must be assigned to the several departments. The increase of the Library has become a matter of pressing importance, and the schools maintained by the Museum encroach heavily upon its resources, although the Trustees themselves, to save what they could for the Museum, have generously made up a large part of this expense. The building occupied by the Museum is already small for the accommodation of the collections, some of which cannot be shown for want of space to display them. The glass skylight also gives trouble by continual breaking, and needs constant repair. Among the objects of art acquired by the Museum during the year are a medallion of the Assumption by Luca della Robbia, some paintings presented by various persons, and a curiosity in the shape of a landscape by Robert Barrett Browning. Besides these, a small collection of American antiquities has been purchased, and a praiseworthy activity has been shown in obtaining the loan, for exhibition, of works of art belonging to private persons. On the whole, the year has been a useful and successful one, and the steady enlargement of the collection, although not perhaps signalized by any great good fortune, is perhaps the sort of development most to be desired.

THE new process of extraction of coal from mines by means of cartridges of quick-lime has, as it seems to us, a peculiar interest in its relation to the similar processes which are or might be, used in quarrying the softer stones. The lime process has now become well established in several collieries in England and every month adds to the number of persons who appreciate its advantages. These are, as our readers know, the avoidance of the smoke and poisonous gases inseparable from blasting by means of powder; the superior quality of the coal detached, which falls in large pieces, without the waste in dust and fine coal caused by the concussion of a powder explosion; the saving of time, since the miners can work continuously beside a lime blast, instead of retreating in a body to wait until the firing of powder is over, and the smoke has cleared away; and finally, the saving of expense, which amounts to about three per cent of the cost of extraction. The only disadvantage hitherto mentioned in connection with the lime process is the soiling of the coal with the white lime-paste from the cartridge, a circumstance which, although of the smallest possible real consequence, causes a slight depreciation in the salability of the coal; while in some cases, where the passageways in the mine are narrow, the bulk of the bags of lime does something to obstruct them. These objections would not be felt at all in applying the process to the quarrying of stone. There is usually plenty of room in and about a quarry, and the soiling of the stone by a substance so easily washed off as lime would be a trifling matter.

THE EDINBURGH ARCHITECTURAL EXHIBITION.

AN architectural exhibition of great interest has just been held in Edinburgh under the auspices of the Architectural Association of that city, to whom the greatest credit is due for their energy and enterprise in gathering together such an interesting and instructive collection of drawings. The galleries of the Royal Scottish Academy having been placed at their disposal, the Committee found themselves able to accommodate something like one thousand paintings and drawings, which were arranged and classified with considerable skill and care, so that each room in the spacious suite had a distinctive character of its own, while the whole exhibition had a more or less historical element pervading it throughout. It is not too much to say that a more effective or numerous collection of architectural drawings has seldom, if ever, been brought together, and general regret must be expressed that owing to a variety of circumstances the Exhibition could only be kept open for a very limited period. The success of the effort has, however, been most marked, and it is to be hoped it may serve to encourage the Association to further exertions in future years, as, apart from the limited display of architecture at the Royal Academy every summer, there is no architectural exhibition worthy of the name now held in Great Britain.

Following the historical idea, we find the first room full of drawings and paintings relating to old Edinburgh, with several portraits of the architects who have made their city famous. Prominent among the latter are William and Robert Adams, the "Adelphi Adamses" as they were often called in London, and the founders of the style known by their name, and which is at present so much in vogue in art circles. They were the architects of the Register House, the University Building, in Bridge Street, and of Charlotte Square in Edinburgh, all of which bear the unmistakable traces and features of their peculiar phase of Classic.

Then there was Playfair, the man who did more than any one in the way of architecture to earn for Edinburgh the name of "Modern Athens," as his works in the Greek style testify; such as the Royal Institution, in the galleries of which the exhibition was holding, the College of Surgeons, and other works; as also the well-known Donaldson's Hospital, in another style, at the West end of Edinburgh. Hamilton, also the architect of another Greek work, the High School, is here, and Kemp, the author of the famous Scott Monument, while the portraits of James Craig, the designer of the new town of Edinburgh, and of Gillespie Graham, the designer of the well-known Assembly Hall, and David Bryce, the reviver of the modern version of "Old Scotch," make up a list of most remarkable men of whom any capital may be proud.

In and among these portraits are "bits" of old Edinburgh, and drawings of Melrose (by Kemp), Holyrood, Roslin, Kirkstall Abbey (by Roberts R. A.), and various views of characteristic old Scotch churches and castles, with many fine drawings of the works of the men just mentioned. This room at once strikes the key-note of the deeply interesting character of the exhibition, and this getting together the men and their works is quite one of the "happy thoughts" which seem to have occurred to the committee more than once in the progress of their labors, and though necessarily the local interest is perhaps the strongest, still several of these works and their authors have alike a world-wide fame.

In the second room we have drawings and sketches of old work at home and abroad, including three splendid paintings of Venice, by Canaletto. Among the most noticeable contributions are a series of very clever water-color sketches, by R. Phené Spiers, of old buildings in Egypt, Palestine, Belgium and France, executed with that broad, effective touch for which he is so well known. A view of St. Peter's at Rome, by the late David Roberts, R. A., and of a Spanish altar-piece by the late John Phillip, R. A., heightens the pictorial interest of this room, which is more than sustained by some very beautiful paintings of old Greek Temples, by Lady Ruthven, such as "The Temple of Theseus," "The Temple of Jupiter Olympius," Athens, and the "Temple of Minerva," Athens. Among the same class of subjects there are views of the Temple of Jupiter, and "A Corner of the Parthenon," by John Lessels, a well-known Edinburgh architect. While in this classic school we must also notice a design for a "Temple of Victory," by Professor Donaldson, remarkable for its knowledge of classic lore and of a phase of work which has no representatives now. As we look on this work, and another by the late Thomas Hamilton, his "Design for the National Gallery," we feel tempted to ask what has become of the training and knowledge that could produce such works now? The polished, cultivated Greek has vanished before the picturesque Goth, or the vagaries of Queen Anne, and one wonders what we have gained by the change. Certainly, as we may have occasion to remark farther on, the Scotch architects have never done any Gothic at all equal to their Classic, and where one man, such as the late David Bryce, was working in both styles, his Classic buildings in the town, such as the Bank of Scotland and the Scottish Widows' Fund Office, were always better art than his Scotch-Gothic castles in the country.

Passing on to the third or "Great Room," we find it occupied with the works of some of the leading architects of the day. Norman Shaw is represented by "The Whispers" and "Pierrepoint," in Surrey; by his houses in Cadogan Square and his Insurance Office in St. James's Street, London, all well-known examples of his masterly style. Waterhouse sends almost a historical list, from the Assize Courts in Manchester, which first brought him into fame, to the Central Technical Schools, at South Kensington, which are only now rising into being. The list comprises a great variety of work, and includes his Town-Hall at Manchester, the colleges at Cambridge, the chapel at Eaton Hall, the Natural History Museum at Kensington and others; a most interesting series illustrated by water-color drawings executed by himself. One cannot help pondering over the great opportunities given to, and the great amount of work actually done by this clever architect during the last twenty years, equalled in this respect by scarcely another member of the profession in England.

Then the great Gothic men, Street, and Scott, and Burges, are also here in force. The works by Street are his original design for the New Law Courts, shown in a large bird's-eye view; his design for St. Mary's Cathedral, Edinburgh, which Scott gained in the competition; the North Porch of Bristol Cathedral, a perfectly beautiful drawing, from his own hand. A house in Cadogan Square, London, the church at Roddington, and the monument to the late Dean of York, in the Minster, complete a most representative list of the master's works. They are all so well known that description is useless; we feel we are in the presence of a great artist as we stand before these splendid works, hardly knowing which to admire most—the genius of the designer, or the skill of the draughtsman. The exhibition of such works as these ought to be of the greatest value to all students of Gothic architecture. Scott's works comprise the exterior and the interior of his great Cathedral at Edinburgh (St. Mary's), parts of which are also shown by photographs; his competitive design for the Hôtel de Ville, Hamburg, a florid design of German Classic character, and an early work, the Episcopal Church at Leith. The Cathedral is still unfinished, the two western towers of the chapter-house being still in the future, but the general effect of the church is very striking, and will be still more so when the group of the three spires is completed. One cannot help noticing how much more successful Scott has been in introducing features and details of Scottish character in this Cathedral than he was at the Glasgow University, where he seems to have quite misunderstood them altogether, and we would point to the treatment of the clerestory and the great west doorway as notable examples of this. The central spire looks as if it had rather too much entasis—perhaps it will look better when its two western companions are built—and the great east windows come rather too low down to the ground; otherwise the church has great dignity, and was, after all, perhaps the "safest" design in the competition. As a contrast to it we have here Burges's design in the same competition, and though shown in two beautiful water-color drawings—the interior particularly so—it was clearly impossible for a Scotch Cathedral, being utterly out of style and feeling with every thing in the country. Artistic it cannot help being, as all Burges's work is, but inappropriate all the same, without a doubt. But the work which interests most of all in this as well as in the next room — which is also principally devoted to modern architecture — is the Scotch work, as certainly no such complete collection of it has ever been got together before. The London work, through the medium of the professional papers and otherwise is all more or less familiar, but it is otherwise with the bulk of the work done in Scotland, very little of which ever seems to be illustrated. In the place of honor stand the works of the late David Bryce, R. S. A., shown by over a dozen of his best buildings. They naturally divide themselves into two portions, the Classic, and the Gothic or "Old Scotch," and though a master in his treatment of Classic detail, it is by his Scotch castles and by Fettes College, a more Continental version of his favorite "Old Scotch," that his name will always be, in the main, associated. Indeed he may be said to have revived the Scotch Baronial style, for, though it was tried before his day, it was only in a tentative fashion, lacking both the letter and the spirit which Bryce's vigorous mind infused into it. He had an enormous practice; so much so that there is hardly a Scottish county which does not possess some of his works. His country houses became famous and some of the most famous are shown here, generally by water-color drawings, which, by the way, are not always very successful as pictures. It is almost impossible without illustrations to give an idea of such houses as Cortachy Castle, Forfarshire, or Castle Milk, Dumfriesshire; the former with great square tower and entrance courtyard, and the latter with its equally great circular tower and splendidly turreted gables. We feel how closely the old examples must have been studied and how well the spirit of the old work has been caught, and yet somehow there is something lacking. The mullioned windows are not always of the best proportion; the transoms cross them at unhappy points; and the sheets of plate-glass which fill them suggest anything but a Scotch castle. These windows, indeed, seem to have been the artist's weak point; he does not know quite what to do with them, and evidently had not the courage to treat them with lattice glass as Mr. Shaw does in his wonderful manor-houses; but in gables and turrets and roofs he is always effective, and often imparts great dignity to their picturesque grouping, such for instance as the entrance gable at

"Craigends," which is very striking; but immediately again the tone falls away as we come to the windows of the Hall with the rather weak-minded buttresses between them. A great feature with Bryce is also the great terrace staircase on the garden front of his houses, by which access is obtained from the public rooms, raised some height from the ground, to the lawn or park. This, with its wide flights of steps and quaint stone balustrades, is generally most admirably treated and seems to have been studied with great care. Except, perhaps, in the case of Fettes College, where he departed from the true Scotch type of work, he was not so successful as at Langton in Berwickshire, which is more Elizabethan in style. Fettes College, one of his greatest works, in the outskirts of Edinburgh, is rather more French in style, reminding one in its detail a good deal of the Palace of Justice at Rouen and other buildings of that date. It is also a trifle "busy," and the central tower, up to the eaves of its roof is rather low, as the roof itself is somewhat high, but here again the grouping of turret and dormer, gable and chimney is admirable and the detail excellent. The weakest point seems to be the chapel of the college, which surely lacks the necessary dignity we expect to find, and this reminds us that Bryce never seems to have understood ecclesiastical Gothic as he did domestic work. His churches in this style are mostly failures. His Gothic design for Free St. George's Church, never carried out, is chiefly remarkable for a tower with an open-work crown after the manner of St. Giles Cathedral; but, again, he was very strong in Classic; two of his buildings in that style have already been mentioned. The Bank of Scotland is a most artistic production, and admirably fills its picturesque site. The style is treated with a freedom and a refinement which show how thoroughly he understood it. Like Sir Charles Barry, while working away at a certain phase of Gothic he comes back every now and then to surprise us with a wonderful example of Classic, as if after all it were there that his true strength lay.

Of course all this work was not without its influence, and consequently we find other architects treading more or less successfully in the same path. Though the work has not always the vigor of Bryce's, still some of it is very good, and sometimes, from the buildings being on a smaller or less pretentious scale, they catch more easily the spirit of the old work. Among other names we may mention Peddie & Kinnear, J. T. Roehead of Glasgow, John Lessels, MacGibbon & Ross., Wm. Leiper of Glasgow, David Cousin, and so on, all of whom have been working at the revival of the old Scotch style, and with considerable results; but here what we may call the Scotch phase of the Gothic revival seems to have expended its force. When we come to church Gothic the work is not nearly so successful; indeed, the true spirit of ecclesiastical Gothic seems to be quite missed in many of the recent churches. Whether this is to be attributed to Presbyterian influence or not it would be difficult to say; but so it is, and instead of finding a school with a definite aim set before it, we come across churches of all phases of Gothic, and some of no recognized type at all. This is the more surprising, also, in that the old church work of Scotland had such a marked and vigorous character of its own, as witnessed in Leipsic and Glasgow, in Melrose and Dryburgh, in Holyrood and Sweetheart, and in churches, or the remains of them, all over the land. The church architects seem to be striving after Early French, or Early English, or Early Italian, or Early anything but the splendid old Scottish work lying at their very doors, and while they have stayed to study the castle, they seem to have passed the church by on the other side. Perhaps they may have despaired of being able to clothe the simple requirements of Presbyterian worship in the letter or the spirit of the old Catholic times. As it cannot be said to be from lack of funds — some of the newer churches being large and elaborate in their ornamentation — one is almost forced to think it must be either from want of will or from some idea of novelty. A like craving after foreign notions once crept into the revival of English Gothic, and for a time led captive even some of the best men of the school, but, fortunately for the sake of art, it as quickly passed away. Let us hope it may be so with Scottish Gothic, and that ere long we may see a healthy phase of the beautiful style of the country arise out of the present chaos. The bringing together of so much contemporary work affords such a useful opportunity of comparing notes as to the progress being made, that it cannot fail to have a most beneficial effect on all true followers of architecture, the result of which may be confidently looked for in future exhibitions.

If the architecture of the churches is not always that most to be desired, the planning and arrangement are often admirable, testifying to the thought and study given to the problem how best to accommodate a large congregation without sacrificing all architectural effect. The tendency seems to be in the direction of wide naves, with, in some cases, narrow aisles used principally as passages, or in others with transepts with side galleries therein. In either case there is opportunity for considerable architectural display, which in many instances has been taken full advantage of with striking effect. As examples we may mention a church at Greenbank, Greenock, by Mr. Blane, one in Glasgow by Mr. Leiper, another in Glasgow by Mr. Campbell Douglas, while the Free Church at Crieff, by J. J. Stevenson, is a decided advance in the direction advocated, and has a great deal of Scottish feeling and features in its architecture, particularly in the tower, which is perhaps a little too domestic in treatment. A notable exception to the foregoing remarks is also to be found in the churches of Mr. Robert Anderson. As they are principally for the Episcopal church, this may have something to do with it; at all events they form quite a group by themselves, and are designed with great care and study, with considerable purity of style, which is generally in a phase of Early English. The views of St. Vigean's Church, Arbroath, and St. Augustine's Church, Dumbarton, are charmingly drawn, as are also the Episcopal Church, Stirling, and St. John's, Forfar, while the sketches for the restoration of St. Germain's Cathedral, Isle of Man, are most interesting, both as designs and as drawings. The Catholic Apostolic Church, Edinburgh, is a large church in a round-arched style, also by Mr. Anderson, but not nearly such good architecture as his smaller works. While speaking of this architect's works we must not forget to mention his New Medical School of the Edinburgh University. This is a most important building in a free treatment of Classic of Italian character. The broken end toward the meadows is most effectively treated, but the return side to the street is rather flat and wanting in relief. The square tower at the angle of the two fronts is somewhat squat in appearance. Only part of the buildings are as yet carried out, the large campanile which forms such a striking feature in the design being still in the future. The roofs are covered with red, Italian-looking tiles, a most welcome bit of color, while a light-reddish stone is used for shafts, etc., in the windows. The building is very carefully detailed, and contains some very good carving. Here, again, as elsewhere in the exhibition, we are constantly impressed with the idea that the Scotch architects are much more at home in Classic than in Gothic. They do very good Classic indeed, and treat it with a freedom and a character all their own: so different, in fact, to what one finds elsewhere, that it begins to appear quite vernacular. Perhaps this may be a survival of the Greek revival under such artists as Playfair and Hamilton; perhaps it is owing to the splendid building-stone so fitted for the display of Classic mouldings. At all events a capacity for the style seems indigenous, and opportunities for it are seen to crop up quite naturally. Apart from Scott's Monument, one would as soon expect to find a Gothic building in Princess Street or George Street as in Athens. When Bryce had to do a bank, or an insurance-office, or a club, it never seems to have occurred to him to try it in his favorite "Old Scotch," and in like manner, when Anderson does the Medical School or the Conservative Club, his Gothic is left in the church, and he gives us his version of Classic. Thus the Classic tradition has never been suffered to die out. As in Edinburgh, so in Glasgow there are always men who are doing good Classic, whatever their Gothic may be, and in consequence there are plenty of excellent Classic buildings to be seen in both cities. When Glasgow proposed to build herself a new municipal home, she asked for Classic, and here in the exhibition we have the successful answer to her appeal, by a London man, some may say, but by a Scotchman all the same, as Mr. William Young belongs to Paisley. The various elevations are shown, with the original sketch sent in in the preliminary competition. It is interesting to note the progress made in working out the design to that which won the final competition, and Glasgow is to be congratulated on having secured what ought to prove a *hôtel de ville* worthy of her importance. The design is well composed, with considerable variety in the treatment of the different fronts, and a noble tower as the great central feature. It seems carefully studied in detail, also, and the general arrangements are remarkably well planned. So far as the designs have yet been made public, we think Mr. Young has fairly won his honors, and it is to be hoped he may as honorably be enabled to carry out his work in his own way.

Of the arts connected with architecture very little is shown in the exhibition, but what there is is very interesting. In the fourth room we have several drawings of interior decoration, by the firm of Bonnar & Carfraw, slightly given to the blue-green school, perhaps, but artistically and picturesquely treated for all that, and yet not without a certain air of home and comfort as if they would be pleasant rooms to live in. Also, some rooms by Messrs. Whytock & Reid were somewhat more pretentious, but not so good as the others; besides designs for, and drawings of executed work in sideboards, cabinets, chimney-pieces, etc., by various firms who have given much attention to this class of work. We noticed some very artistic furniture designs by Mr. John W. Small, showing study and knowledge of old work in a marked degree.

Stained glass is also represented by contributions from the well-known firm of Ballentine & Son; a group of designs in one frame, both for Renaissance and Gothic work, being particularly worthy of notice. Messrs. Adam & Small also send several creditable designs in this department.

The walls of the fifth room are almost entirely covered with some splendid tapestries, exhibited by Messrs. Whytock & Reid, one panel being a most exquisite piece of work. They are from Arras, Gobelins and Brussels, and contain figure-subjects with borders of fruit and flowers, very gorgeous in color, and of great merit in drawing and composition.

On screens in this room are a number of photographs of old and new buildings at home and abroad, together with a most interesting series of "Sketches in Pencil of Continental Architecture," by Mr. David MacGibbon, the President of the Architectural Association, careful studies of valuable bits of Continental work, evidently the result of a sketching tour. A similar series of sketches by Mr. John Lessels, as well as drawings of old work by the late James Drummond, R. S. A., George Simpson, Ross, Dick and others, are evidence of the study devoted to old examples.

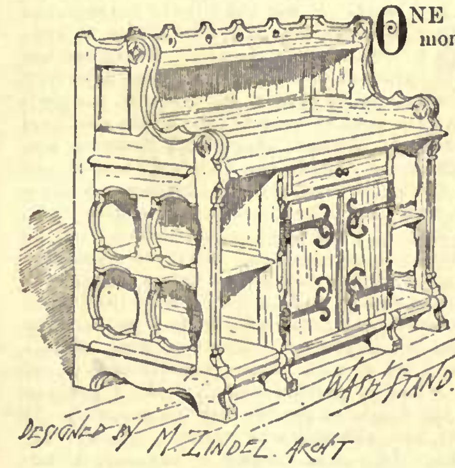
Several models throughout the rooms are well worthy of notice,

such as the Scott Monument, Donaldson's Hospital (the original design), Dalkeith Palace, from a design by the late Mr. William Burn; this and the model of the Scott Monument having been executed by Kemp, the architect of the latter.

The sister art of sculpture is also represented to a limited extent; there being several good statuettes by the Brothers Stevenson, Mr. J. Stuart Burnett and Mr. Rhind; a splendid bust of Bryce, by the late George Macallum, another of Kemp, by the late Handyside Ritchie, and one in marble of William Burn. Mr. D. W. Stevenson also sends the model of his design for the Byron Memorial, which becomes invested with additional interest from the notoriety lately surrounding the design by Belt, as now carried out in London.

No notice of this interesting exhibition would be complete without a few words of commendation to the hanging committee for the skill and knowledge shown in the arrangement of the pictures and drawings. Not only had each room a distinctive character of its own, but great judgment was shown in the grouping of the exhibits together, so as to increase rather than diminish their individual value; while the general scheme throughout heightened the interest as the visitor became more familiar with it as a whole. To the President of the Association, Mr. David MacGibbon, and to the various members of the Committee, Messrs. Bonnar, Ballentine, McLachlan, Blanc, and others, including the indefatigable Secretary, the thanks of the profession are most warmly due for the valuable opportunity afforded to it of becoming acquainted with a great variety of contemporary work not easily accessible, and so enabling some notes to be made of the progress of our art during the last twenty years or so; a progress alike interesting and encouraging, and fraught with good omens for its best interests as a fine art. We feel sure it must also be a source of great gratification to the members of the Architectural Association generally, to know that their efforts have been so highly appreciated, and their new departure rewarded with such an abundant measure of success, as it is also re-assuring to the public to find professional societies of this kind identifying themselves in this marked manner with, and striving so hard to promote the best interests of their work, especially so when we consider the dual character of architecture, and come to know the great value of a higher education in it, both as a constructive and a decorative art, if it is to maintain the time-honored traditions which have won for it the proud designation of the Mother of the Arts.

BATHS AND BUANDERIES.



ONE of the institutions common in European cities, which it would be desirable to transplant to New York and other large American cities, is a *buanderie*, as it is designated in France and Switzerland. This is simply a laundry with baths attached. There should be one in each district of New York, where the housewife or domestics of families of small or moderate income may do laundry-work at no greater expense than the cost, reduced to its minimum, of the necessary conveniences. It is the principle of co-operation applied to the most disagreeable and costly kind of household labor, by which strength, time, and expense are economized. It is, in Europe, a natural sequence of the apartment-house system, where there are no household laundries.

There is a model establishment of this kind, of which the inhabitants are justly proud, in Geneva, on the Rue du Rhone. It consists of a main building, with a broad, handsome portal, reached by two or three steps, and a long wing on each side containing a corridor with small bath-rooms, the left wing being for women, and the right for men. Each bath-room contains a fine metal bath-tub, a chair, a mirror with a shelf under it, and hooks for clothing. In the hall is a small office in which the director of the *buanderie* sits, with piles of snowy linen towels on one hand, and different varieties of toilet and laundry soaps, at cost prices, on the other. The main building is filled with stationary wash-tubs supplied with hot and cold water. There are also drying-closets, as well as accommodations for open-air drying on the roof.

A person wishing to use the apparatus applies at the window of the director, and receives permission to enter the main building. The charge is four cents per hour, which includes a half-hour's use of the drying-closets heated with hot-air, or, if preferred, the linen may be dried at home. One also applies for a bath at the window of the director, depositing eight cents, for which a towel and metal check are rendered. For the additional sum of three cents a warm linen sheet or wrapping-gown of Turkish towelling is supplied, or one can provide one's own towels. After each bath the bath-tub is scrubbed with soap and an ordinary scrubbing-brush, and the room aired.

This establishment in Geneva was built in 1857, partly from motives of philanthropy, by a stock company, at a cost of $30,000. This sum, however, being insufficient to pay the first expenses of furnishing and opening the establishment, a mortgage of $2,000 was added to the cost. For twenty years it paid only three per cent to the stockholders, the rest of the profits being absorbed by the expenses of furnishing, in paying up the mortgage, and in liquidating $10,000 worth of the original stock, so as to reduce the capital to 100,000 francs. It was reorganized four or five years ago, on a new basis, and now pays five per cent (a large interest in Switzerland) to the stockholders. The ground also has quadrupled in value since its erection. The director stated that the profits would have been greater if it had been built in a more solid and durable manner, as a considerable outlay is made every year in repairs and improvements. The director receives a salary of thirty dollars per month, and is assisted in his duties by his wife. He is lodged, his rooms warmed, and his washing done free of expense. Besides this he receives presents to the value of about sixty dollars per year, and four per cent of the net profits of the exploitation.

There are many *buanderies* in Paris, though none, perhaps, so modern and comfortable as the one in Geneva. In Paris the least price for a bath is six cents, but many of the establishments charge ten, and eight if a subscription of six tickets is taken. Two additional cents are charged for towels, the furnishing of which is optional, and five cents for a Turkish wrapper or a linen sheet, ordered beforehand, and brought in warm when the bell is rung.

There are bathing-establishments in Paris which have no laundries connected with them, and from both these and those with laundries baths are sent to the domicile. A light metal bath-tub and water at a specified temperature are delivered for twenty-five cents at any story of houses in the same quarter. The conveyance, drawn by one horse, is a skeleton frame on wheels, supporting a barrel with a bath-tub perched on top. The whole is painted a brilliant yellow or red color, and, as it darts through the crowded streets, gives one the impression of a huge water-spider on a predatory excursion. In case of illness, these baths, promptly rendered at an invalid's bedside, are very convenient. Warm linen, brought in a heated apparatus, is furnished at the same price as in the bath-house.

Very few even of the newest houses in Paris, with the exception of a limited number in the stranger's quarter (Quartier des Champs Elysées, near the Avenue Josephine and the Arc de Triomphe), are furnished with bath-rooms. As to stationary wash-stands, they do not exist in Europe, fortunately for the health of the race.

London possesses a fine *buanderie*, called the St. George's Baths and Wash-Houses, in Davies Street, Berkeley Square, built and presented to the London public by the parish of St. George, Hanover Square. The money was raised by a loan, to be paid off in thirty annual payments. The baths, open from six A. M. to nine P. M. (on Fridays and Saturdays till ten and a half P. M.), are for both sexes, at two prices. In their plainest form there is a little cabinet, with a metal bath-tub having a broad wooden border to sit upon, a wooden bench, mirror, and hooks for clothing. The tariff is four cents for warm, and two for cold baths. Larger bath-rooms, with more conveniences, such as a small carpet, and the added but doubtful luxury of a hair-brush, cost eight cents. These rooms are extremely neat and comfortable.

Saturday afternoon when I visited the establishment the baths were largely patronized by young ladies engaged in commerce (the dry-goods shops in London close at two P. M. on Saturday), and a din, such as is only heard in the vicinity of a school-house when school is dismissed, arose from a swimming-bath filled with schoolboys. The price for the swimming-bath is eight cents on the three first-class days in the week, and four on the three second-class days.

A large and comfortable laundry is situated over the baths. Here are long lines of stationary wash-tubs supplied with cold and boiling water. Opposite each wash-tub is a small drying-closet with hot air laid on. One end of the room is occupied by an ironing-table, sufficiently long to accommodate a number of ironers. There are also skirt and shirt boards, etc. The irons are heated in an adjoining room, only a few steps from the ironing table, on a large stove shaped like a pyramid, with rows of flat-irons in tiers. The tariff for these labor-saving appliances is one and a half cents per hour for the first three, and two cents for each subsequent hour.

The income of this institution covers running expenses, but yields no profit above the salaries of its attendants and the annual cost of repairs and improvements. The cost of the building was $85,000. It is built on leasehold ground at a rent of $1,000 per annum. The ticket-receiver, at the entrance, is paid twenty-one shillings weekly. The director, and his wife, who is also the matron, receive a joint salary of $650 per annum. There is also an engineer and fireman whose weekly wages are respectively forty and twenty-eight shillings. The interest of the loan is raised by a tax on the inhabitants of St. George's parish. The second-class baths do not pay current expenses, the tariff being low to encourage cleanliness in the laboring classes.

Besides the St. George's Baths and Wash-Houses, there are, in London, some forty swimming-baths. To most of these establishments are attached wash-houses and private baths. The Paddington Baths, Queens Road, and Bayswater, are the finest found at the West end.

They cover an acre of ground, and accommodated during 1881, 235,000 bathers. The first, second and third class swimming-baths are floored with white glazed tiles. The first-class bath is 30 yards long and 13 wide, containing 110,000 gallons of pure, clear water changed daily.

The Pompeian Bath is the finest in the metropolis, $25,000 having been spent in its construction. Its dimensions are 24 yards by 9 yards. It is handsomely tiled in patterns, while the dressing-rooms are of dark wood decorated with artistic porcelain plaques.

The Roman baths, many hundred years old, in Strand Lane, are the oldest in London. They are situated in a dark, cold cellar, and the original Roman tiles remain in perfect preservation. This bath is not used for bathing, but its water is served out at two cents per pitcher to people whose passion for the ancient leads them to attach a sentimental value to this water. Near by is a plunge-bath once used by the Earl of Essex, popular among "gentlemen of the Temple," who pay a shilling for a bath in the coolest and oldest bath in London, — with a souvenir attached to it of the handsome Earl, whom the cleverest sovereign of England delighted to honor.

One can hardly dismiss the baths of London without speaking of the Fitzroy Baths near Tottenham-Court Road, the total cost of which was £35,000. There are two swimming-baths, twelve and four cents respectively, and accommodations for seventy-eight washers. In 1881 there were 227,000 bathers and 45,000 washers. The total receipts were £4,500, and the expenses £2,600.

The Rotherhithe Baths, in the Deptford Road, are the newest in London, and very popular, being furnished with the most modern appliances. Last year there were 115,000 bathers and 138,000 *washers*—rather a significant fact.

Teachers of swimming are provided at most of the London baths, as well as cork-belts, life-buoys, etc. The favorite rendezvous of racing swimmers is the bath in Wenlock Road, which affords a swim of fifty-six yards, while the well-known London Swimming Club has its head-quarters in Golden Lane.

In American cities we need public baths at a low price for persons who have no convenience for bathing at home, and, in connection with *buanderies* or laundries, they could be furnished at a trifling charge. Public laundries are desirable, not only for persons who have no laundry accommodations at home, but also for small families who keep but one domestic, and prefer not to have their households disturbed with the steam and confusion incident to "washing-day." Ironing at the laundry would be optional, though desirable, on account of superior facilities. One of the new American machines, for smoothing collars and cuffs, would be much appreciated in this department. It would be desirable in New York City to have a *buanderie* in each ward, built by capitalists willing to accept a low rate of interest on their capital, and who invest it in this manner partly from philanthropic motives. Possibly the receipts should be no larger than would defray the incidental expenses and net three per cent. The price of the baths and use of the apparatus should be no greater than in Paris or Geneva.

The director of the Geneva *buanderie* expressed to me his opinion that the first *buanderie* built in New York should be double in size that of Geneva, as the greater receipts would thus diminish the general expense. He thought a good establishment of this kind might net eight to ten per cent, and that a capital of $100,000 would not be too much to construct one properly.

The great curse of every new convenience or improvement in this country is its dearness. Living is very costly here, and proprietors of new labor-saving dwellings and machines proportionately greedy, while philanthropy occupies itself in many schemes of doubtful benevolence. A public *buanderie* would be a more charitable and Christian undertaking than the investment of large sums in the uncertain fields of missionary labor, to extend a civilization of which the plague-spots only are readily accepted by inferior races.

Who will lead in this good work? Is there no church society like that of St. George's, which, instead of sending its funds to distant lands, in furtherance of schemes of problematical benevolence, to teach an incomprehensible theology to nations incapable of understanding it, would employ its money in a useful work, such as I have described, to assist women in one of their most difficult household tasks, and to furnish facilities to those who would, if they could, obey the injunction of the Master to wash and be clean.

Sarah Gilman Young.

The Sculptor, Geefs. — The Belgian sculptor Guillaume Geefs, who died lately, had, perhaps, during his long life to do with more public monuments than any other man in Europe. He was born in 1806, was the son of a journeyman baker at Antwerp, and won renown at a precociously early age by a statue of Achilles. He was not content, however, with what Antwerp could teach him, but went away to Paris, and worked there for two years in the studio of Ramage. He came back to his native city in 1835, was very soon afterwards appointed professor at the Académie des Beaux-Arts there, the ancient institution which dates from the days of Rubens, and for almost half a century he has been working at sculpture with indefatigable zeal and activity. The squares, streets, and churches of Belgium are crowded with his monuments, very few of which sink below a very high standard of dignity and beauty. Geefs may almost be called a man of genius; and Belgium must be congratulated on the good sense which led her to occupy so workmanlike and vigorous an artist so copiously on the adornment of her cities. The realistic bronze statue of Rubens in the Place Verte at Antwerp is a good example of the style of Geefs — *Exchange.*

ELECTRICAL RAILWAYS IN IRELAND.

FROM POMPEII

THE making of the electrical railway between Portrush and the Giant's Causeway marks an era in the history of locomotion. If the sanguine hopes of its projectors are realized, it will be not less remarkable in the history of Ireland. Nature has left her destitute of those stores of force in the shape of coal-mines, with which England and Scotland have been so plentifully favored; but she has dowered her with an inexhaustible supply of force in the shape of waterfalls, which have run to waste from before the days of Finn McCoul until now. "The costless drainage of a wilderness," which on Canadian rivers Mr. Hussey Vivian found busy converting, almost without the intervention of a human hand, beams of rough-hewn timber into finished doors and windows and all manner of wood-work, has never been harnessed to the service of man in Ireland. The advent of an electrical age promises to change all that, and the Portrush Railway may be the forerunner of the great things which are yet to come, when the Irish have learned to employ the drainage of their hills in driving the machinery of their mills. Turbines planted on the River Bush are to generate the electricity which is to drive the tram-cars from Portrush to the Giant's Causeway. The directors, it is said, are seeking to purchase a waterfall for the same purpose, and it is confidently anticipated that the railway will be worked, as the city of Poona is said to be lighted, by thunderbolts forged by water.

There is something strangely incongruous in the association of the Giant's Causeway, with its mysterious legends, dating far back beyond the gray dawn of history, with the latest development of the applied science of the nineteenth century. That the first electrical tramway outside Berlin should have been started in a remote corner of Ireland is due to the enterprise of the High Sheriff of Antrim, Dr. Traill, whose namesake, Mr. W. A. Traill, has acted as engineer of the line. There have been many electrical railways laid down in various places, but hitherto they have never been constructed by public companies for the purposes of profit. As the Stockton and Darlington Railway is justly regarded as the first of modern railways, although it was preceded by many railways of different kinds, so this Portrush electrical line may fairly claim to be the first of its kind not only in Ireland but in the world. The first electrical locomotive was tried on the Edinburgh and Glasgow Railway forty years ago. It crawled along at a rate of four miles an hour, and was promptly laid aside. It was not till the invention of the modern dynamo-electric machine that the substitution of electricity for steam began to be regarded as feasible. Every one has seen the toy tram-car in the grounds of the Crystal Palace driven by electricity, on which a curious public rides at 6*d.* per head per journey. Similar playthings have been at work at the various electrical exhibitions at St. Petersburg, Munich, Dusseldorf, Brussels, and Berlin. At the electrical exhibition in the Palais d'Industrie, at Paris, the principle was applied in more practical fashion. A tram-car moved by electricity, transmitted from a stationary engine by an overhead cable, brought loads of passengers to the palace from the Place de la Concorde. In a couple of months it conveyed eighty-two thousand passengers to and from the exhibition; but as the fare for the short distance was at the rate of half a crown a mile, it afforded no guide as to the commercial advantages of the new motor. An experiment was made on the Leytonstone tramway some months ago, when a tram-car was fitted up with Faure accumulators and set to work over a mile and a half of private tramway. Its speed was seven miles an hour, but the weight of the car with the accumulators was five and a half tons, and although enthusiastic promoters declared that it would reduce the cost of traction by one-half, the experiment has not been renewed.

A very successful application of the electric motor has been made by a large linen-bleacher in Calvados. The electric locomotive, which generates no smoke, passes up and down the bleaching-fields, winds up the bleached linen, and conveys it to the works. This, however, is a specialty entirely in private hands. The only public tramway worked by electricity is that of the Messrs. Siemens in Berlin. They at first projected an abomination in the shape of an overhead electric railway six miles long; but the Emperor would not allow the Linden to be disfigured, and the projectors contented themselves with a short line a mile and a half long, between Lichterfelde and the Military Academy. The new motor was also employed for a time on the tramway line between Charlottenburg and the Spandauer Bock. The current at first was passed along the rails from a stationary engine, but it is now conveyed by cables slung in mid-air, a frightful addition to the horrors of modern civilization. Although it can be driven at the rate of thirty miles an hour, the regulation pace is not more than ten. It is convenient, simple, and manageable, but it has not been a financial success. On the other side of the Atlantic, Mr. Edison has made a private line, three and one-half miles long, at his works in Menlo Park. He sends the current along the rails, and claims to be able to drive his car at the rate of fifty miles an hour. He estimates the saving at fifty per cent upon the cost of steam; but Mr. Edison is an enthusiast, whose estimates do not always correspond with his results. He has, however, achieved a sufficient measure of success to secure orders for several electric motors, which are to be used on a new

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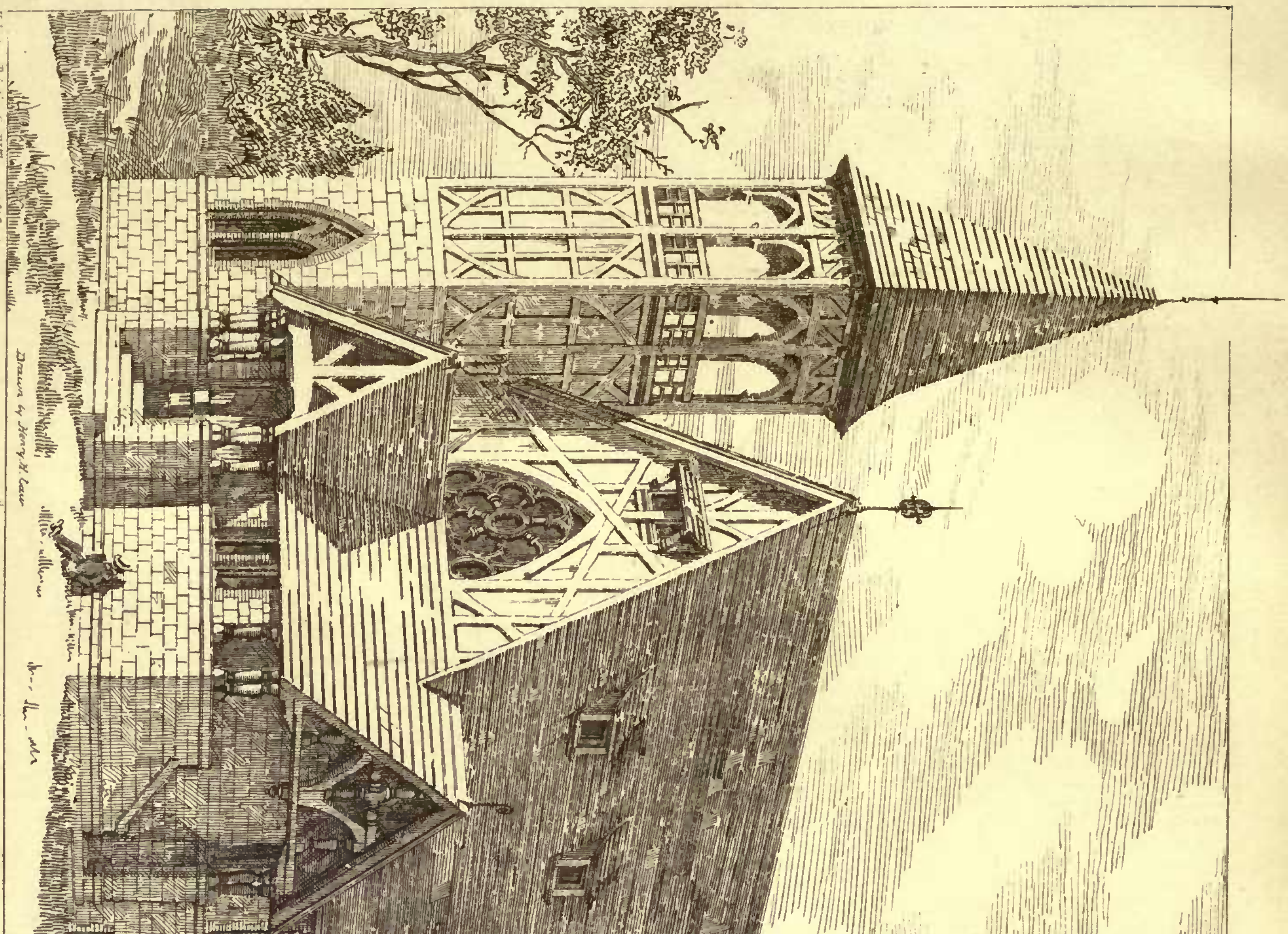

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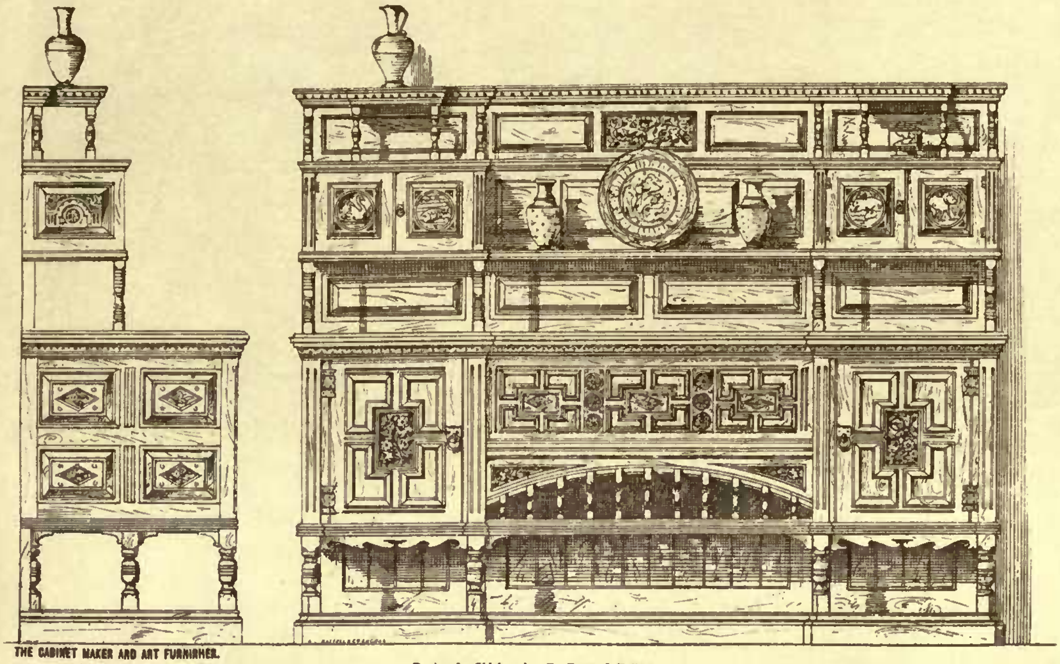
The Bishop Whittingham Memorial Church. Baltimore, Md.

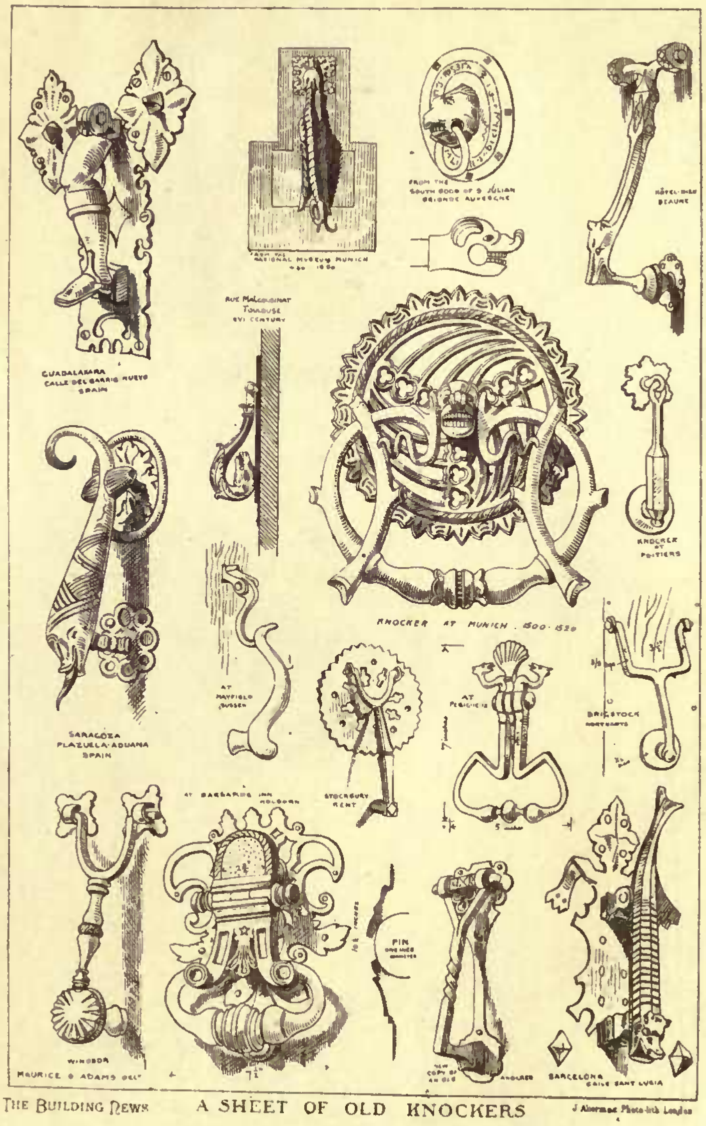
Charles E. Cassell, Archt.

OUR H



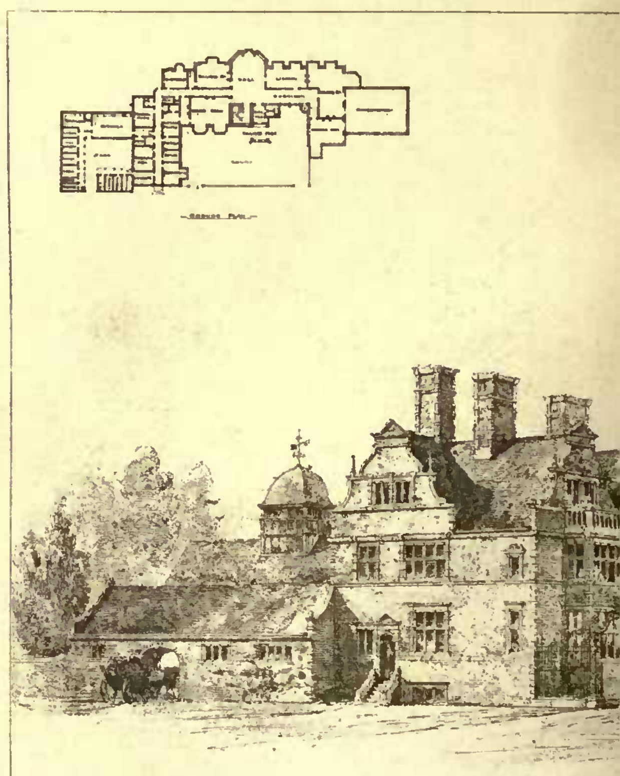
THE CABINET MAKER AND ART FURNISHER.

Design for Sideboard. By Bruce J. Talbert.



THE BUILDING NEWS A SHEET OF OLD KNOCKERS

LA SEMAINE DES CONSTRUCTEURS.



The Architect.

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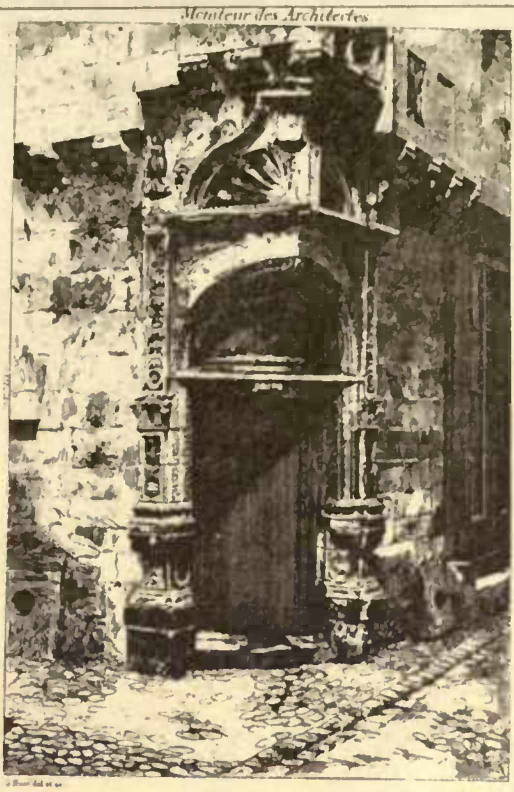
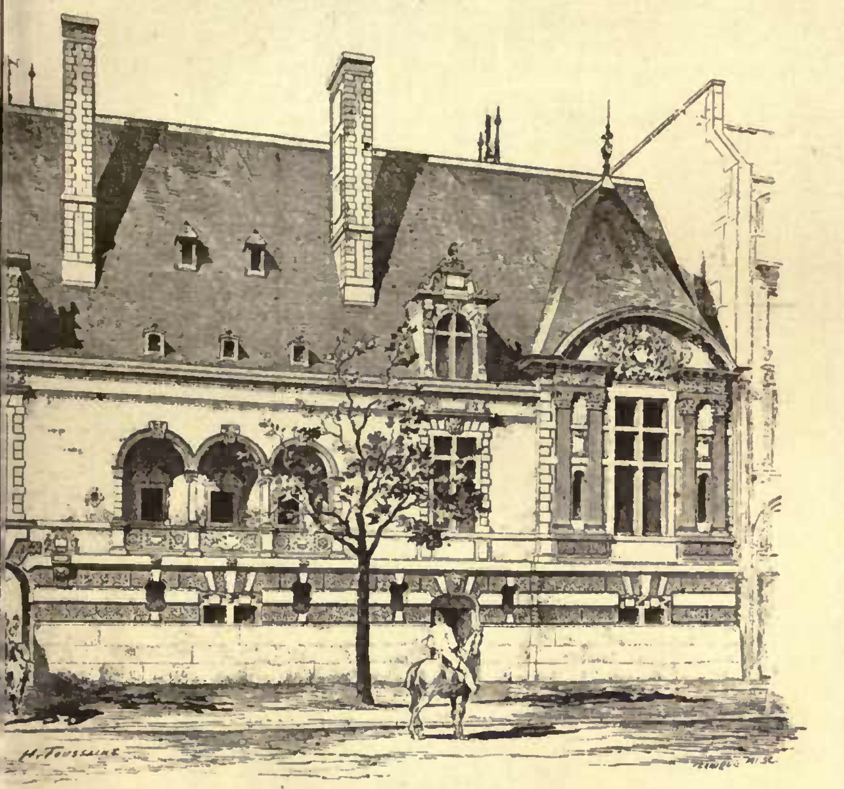
Moniteur des Architectes



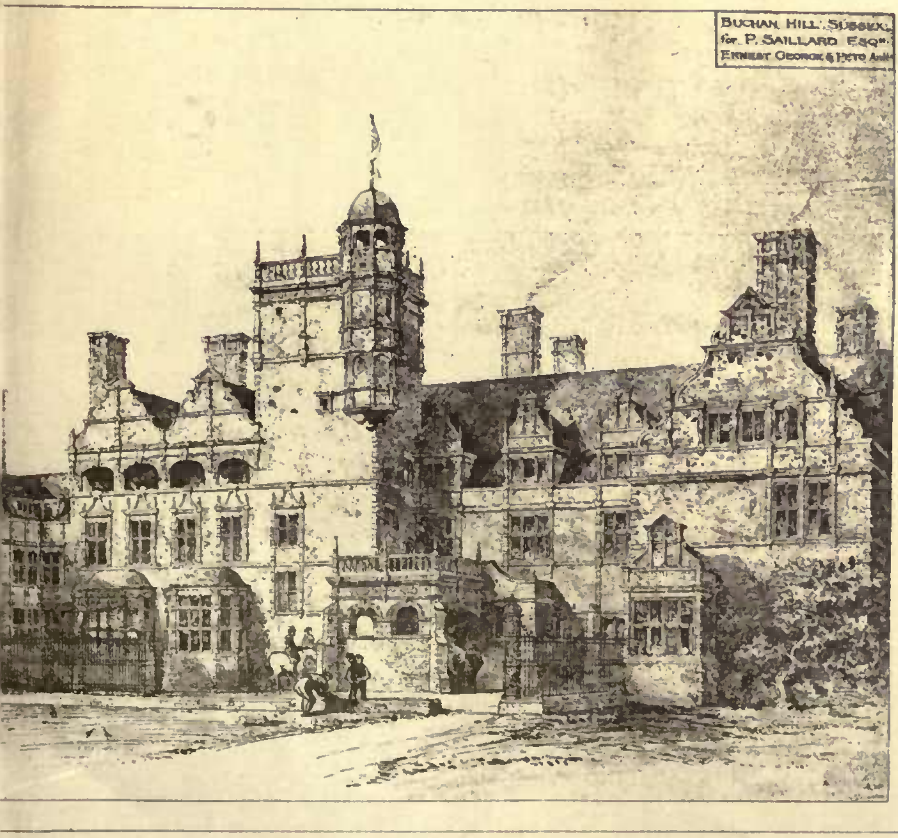
PORTE RENAISSANCE A PERIGUEUX

[HOTE]LS PARTICULIERS RÉCEMMENT CONSTRUITS A PARIS



HOTEL DE M. DE B., AVENUE DE WAGRAM. — Architecte : M. CUVILLIER.

Building News



BUCHAN HILL, SUSSEX, for P. SAILLARD, ESQ^re. ERNEST GEORGE & PETO Arch^ts

Bench Ends from St Peter's Ringstead

The British Architect

[2]11 Tremont St. Boston.

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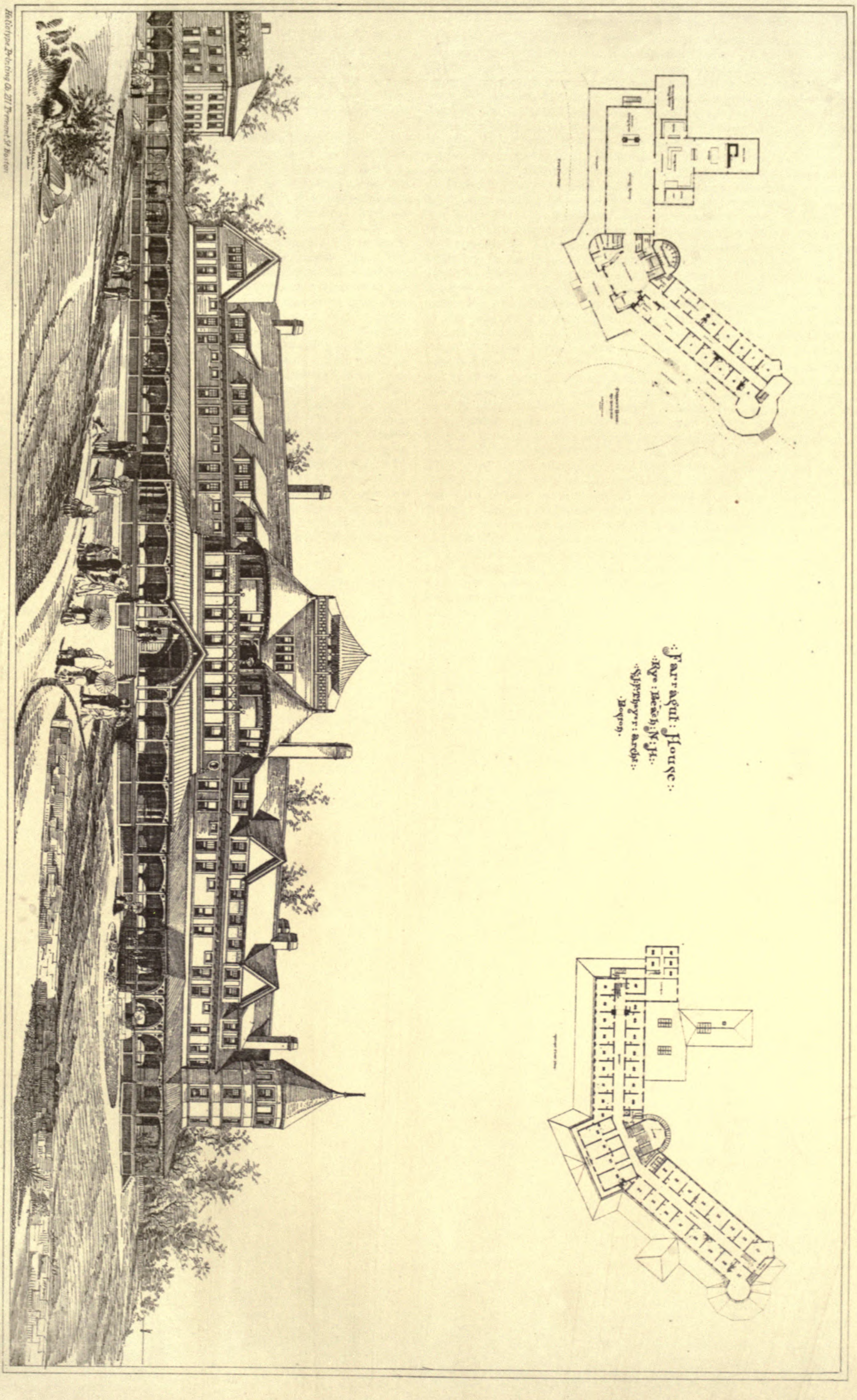


Farragut : House :
Rye : Beach : N. H. :
S. J. F. Thayer : Archt. :
Boston.

Heliotype Printing Co. 211 Tremont St. Boston.

Swiss line. An electric railway is projected in Fairmount Park, Philadelphia, and there is some talk of putting up an overhead electric railway in Paris, to run from the Arc de l'Etoile, at the head of the Champs Elysées, to the Place de la Bastille at the other side of the city. These projects, however, are as yet nothing more than projects, and will probably not be carried into execution until it has been proved that electric tramways will pay.

The Portrush tramway is, however, an accomplished fact. It has been built in the old-fashioned way by a company of shareholders, who raised £45,000 in ten-pound shares, to construct six miles of rail.[1] Being worked by electricity, there is no necessity either for the heavy railway needed to support the weight of a steam-engine, or for the granite-paved track required for horse traction. Another great advantage which cannot be secured elsewhere is that the tramway is laid on one side of the road, and from this raised tram-path all ordinary traffic is excluded by a granite curbstone. The gauge is only three feet, and to twice that extent the company monopolize the highway. The cost of construction under these circumstances has only been one-quarter of that incurred on tramways less favorably situated. The steel rails are laid level with a gravelled surface, and parallel to them extends a third iron rail, which is used to conduct the current from the dynamo machine to the cars, contact being effected by means of an electric brush. The whole of the electricity required is supplied from the central station at Portrush. When the turbines fail to yield the requisite power, steam will be employed to generate the electricity. The line will be used not merely as a tramway, but also as a railway for the conveyance of goods and minerals, electricity being in all cases the only motive power employed. According to the sanguine estimate of the promoters, whereas the cost of working the line by horses would be 11*d.* a mile, and by steam 7*d.*, they expect to effect it at a cost of 1*d.* If they do this their success is assured; but the chances are against them. No electric motor has as yet been able to earn a dividend, and it will be an agreeable surprise if the new railway to the Giant's Causeway should prove an exception to the rule. — *Pall Mall Gazette.*

THE ILLUSTRATIONS.

HOTEL DE M. B——, PARIS, FRANCE. M. CUVILLIER, ARCHITECT.
[From *La Semaine des Constructeurs.*]

THE spirit of the design of this dwelling was derived from a Norman château of the time of Henry II. On the first floor is the bed-chamber of the owner, a bathing-room opening into the loggia shown in the illustration, a dining-room, and on the right a superb picture gallery.

KNOCKERS.
[From the *Building News.*]

BUCHAN HALL, SUSSEX, ENGLAND. MESSRS. ERNEST GEORGE & PETO, ARCHITECTS.
[From the *Architect.*]

RENAISSANCE DOORWAY AT PERIGUEUX, FRANCE.
[From *Le Moniteur des Architectes.*]

DESIGN FOR A SIDEBOARD, BY MR. B. J. TALBERT.
[From the *Cabinet Maker and Art Furnisher.*]

THE FARRAGUT HOUSE, RYE, N. H. MR. S. J. F. THAYER, ARCHITECT, BOSTON, MASS.

THE BISHOP WHITTINGHAM MEMORIAL CHAPEL, BALTIMORE, MD. MR. CHARLES L. CARSON, ARCHITECT, BALTIMORE, MD.

THE ARCHITECTURE OF AMERICAN CITIES.[2]

THE position and look of some of the American cities is very striking and stately. Cleveland by its lake, Cincinnati with the hills above its great river, St. Louis rising above its yet greater river, would hold no small place among the cities of the elder world. So would the federal capital as seen from the Potomac, if only the hideous, unfinished monument could be got rid of. And it fills one with simple amazement to see the way in which a vast and stately city like Chicago has risen from its ashes. In that great city I could see or hear of nothing older than the fire, save a church-tower which showed the marks of fire at its angles, and a single detached wooden house of an antiquated type. This last suggested that Chicago before the fire was something widely different from Chicago after it. But on the whole the American city which struck me most was Albany. Rising grandly as it does on both sides of the noble Hudson, it suggested to me some of the ancient cities by the Loire. It has the advantage, rather rare in American cities, but shared with Albany by the federal capital, of having one dominant building. The general look of the city carried me so completely into another part of the world that, if any one had come up and told me in French, old or new, that the new capitol was "*le château de Monseigneur le duc d'Albanie,*" I could almost have believed him. This State capitol at Albany — why cannot it have a more rational name, like the state-*house* at Boston? — finally settled, for me at least, a question which I had been turning over in my mind ever since I landed in America. This was: What ought to be the architecture of the United States? That is to say: What should be the architecture of an English people settled in a country in the latitude, though not always in the climate of Italy? Should it be the Gothic of England or the Romanesque of Italy? There seemed much to be said on either side; my own mind was finally fixed by the teaching of experience, by seeing which style really flourished best on American soil. I found the modern churches, of various denominations, certainly better than I had expected. They may quite stand beside the average of modern churches in England, setting aside a few of the very best. All persuasions have a great love of spires, and, if the details are not always what one could wish, the general effect of the spires is often very stately, and they help largely towards the general appearance of the cities in a distant view. But I thought the churches, whose style is most commonly Gothic of one kind or another, decidedly less successful than some of the civil buildings. In some of these, I hardly know how far by choice, how far by happy accident, a style has been hit upon which seemed to me far more at home than any of the reproductions of Gothic. Much of the street architecture of several cities has very successfully caught the leading idea of the true Italian style, the style of Pisa and Lucca, the style of the simple round arch and column, uncorrupted by the vagaries either of the Italian sham Gothic or of the so-called Renaissance. In a large part of the Broadway of New York, the main lines of the style — I speak only of the main lines, without committing myself either to details or to material — seemed to be very happily reproduced. The general effect of many parts of that long street struck me as just what the main street of a great commercial city ought to be; and there are some buildings of the same kind in Chestnut Street, Philadelphia, though there they alternate with other buildings of a very strange kind, whose odd fancies make us turn back to look with real satisfaction on the honest brick of Independence Hall. Some of the banks especially seem to have thought that the stumpier they made their columns, the safer would be their deposits. But it was the capitol at Albany which fully convinced me that the true style for America was the style of Pisa and Lucca. The building has a most successful outline; in its details it is a strange mixture of styles, not so much confounded together as used side by side. There are parts which I cannot at all admire; but there are other parts, those in which the column and round arch are employed, which certainly pleased me as much as any modern building that I have seen for a long time. When I say that the arches of the senate-chamber seemed to me, as far as their general conception goes, worthy to stand at Ragusa, some will understand that I can say no more.

I am almost afraid to add that I thought that some parts of the inside of the city-hall at New York were entitled to some measure of the same praise; for I found it hardly safe to speak of that building. Its name at once drew forth bursts of indignation at the millions of dollars which certain persons had contrived to gain for themselves out of its making. Politically, I felt abashed, as if I had somehow become a champion of corruption. Still, I could not help thinking that the columns and arches, of which alone I was speaking, were as guiltless of any offence as Sir Thomas More's beard. So, to come back to the capitol at Albany, I ventured to make the very smallest kind of artistic criticism on some chandeliers in the corridors which seemed to me too big, as hiding some of the architectural features. My remark did not call forth any artistic defence of the chandeliers; but I was much struck at the remark which it did call forth. Some one or other, I was answered, must have had some corrupt object in making them too big. It is certainly odd that one cannot make the most purely artistic criticism, either for or against anything, without calling up thoughts which have very little to do with artistic matters. Certainly I should be sorry to think that the architectural forms of which I speak carry with them any necessary taint of political corruption; for in these round-arched buildings I see a good hope for a real national American style. The thing seems to have come of itself, and the prospect is all the more hopeful if it has. I should be better pleased to think that the forms which pleased me when my eyes were fresh from Ragusa and Spalato were the work of men who had no thought of Ragusa and Spalato before their eyes.

[1] It is said that the total prime cost will be less than one-half this sum, or about £21,000 for six and a half miles of tramway, and inclusive also of the cost of buildings, rolling-stock, electric plant, engines, law, Parliamentary, and engineering expenses.

[2] From an article by Dr. E. A. Freeman in *Longman's Magazine.*

GAS EXPLOSION AT CINCINNATI. — A three-story brick tenement, No. 50 Wilstach Street, was blown to pieces at midnight on the 15th inst. The house contained 17 persons, most of whom were asleep at the time of the explosion. The house was in danger of being flooded by the high water that is now visiting the city, and two boys stayed up all night to watch the rise of the water, and about one o'clock went into the cellar with a lighted candle to get some boards with which to make a raft, when the explosion took place. The accident was attributed to sewer-gas in the cellar, as the high water does not let the sewerage escape, but this could not have been the cause, as the house had no sewer-connection. It is more than likely that the cellar was filled with coal-gas. The destruction of the building was total and complete, and many adjoining houses were more or less injured. Four persons were killed and several wounded. The loss entailed will approximate $6,000.

RECENT BOOKS ON ART.

The contents of this volume,[1] with the exception of the last chapter, were originally published in the pages of the *American Art Review*, and then attracted much attention. When now re-read as a whole they seem even more disappointing than at the time of their first issue. The earlier chapters, which deal with the rise of the art in this country, are instructive, and contain much fresh biographical material, which one is glad to have for reference. But our chief interest lies with more recent things — with the modern practice which has grown up during the last dozen years, and has won for our younger men an almost unchallenged position as not only the best living engravers, but the originators of a school which is destined to be followed by foreign workers — of a movement which is fairly to be called a renaissance of the art. To this movement — to its aims, ideals and methods, as well as to the actual products of its originators — Mr. Linton has an unconquerable aversion. A reading of his book, however, does not show that his hostility is founded on any distinct, solid basis of consistent criticism, but rather — though he himself of course does not realize the fact — upon a basis of prejudice, willful narrowness, and life-long habits of seeing and feeling. That he is consciously unjust I do not believe; but that he is actually unjust, not only to sundry workmen, but especially to the new movement as a whole, no reader can deny. His chapters are controversial rather than historical to begin with. They do not formulate his hostile position with distinctness, or conduct his criticisms on any definite plan. His random remarks, now of praise, now of blame, are often acute, suggestive, and interesting to those whose opinions on the matter are already formed; but they will not give a novice in such criticism any clear idea even of Mr. Linton's own side of the controversy. And still less does the author do what every man who assumes to be a "historian," and not a mere special pleader, should feel himself compelled to. He does not even attempt to state with fairness the ideas and arguments of his opponents; indeed, he does not seem to give them credit for having any of a coherent sort. He hardly recognizes the school as such, though this is the most prominent feature of the matter. In all the band of young engravers, who, with their great diversities of talent and of method, have had a common aim in view and a common enthusiasm in the unravelling of new problems, Mr. Linton persists in seeing only an unorganized troop of rash and reckless innovators, loving novelty merely because it is such, and sinking the true interests of their art in the desire to make a sensation. Naturally he does not say this in quite so clear a fashion; but my indictment can, I think, be amply substantiated from the tenor of his later chapters. Not only, moreover, does he implicitly deny the coherence and definiteness of the recent movement in wood-engraving, but he fails to recognize a cognate and equally important fact: that all beginnings on a new road must be experimental; that only through experimental failures or semi-successes can new and true methods be elaborated, and that many things which are not intrinsically perfect may be very valuable as necessary steps toward perfection. The tentative, daring, original, partially unsuccessful efforts of a few years back, Mr. Linton holds up to scorn as the inevitable results of the new aims. Works which their authors themselves have long since condemned, both by words and by the most conclusive evidence of their recent practice, Mr. Linton often judges as though they were still complacently regarded by editors and engravers as indisputable pieces of perfection. Even when he praises the work of some among the "new men" — as notably of Mr. Closson — he does it in a fashion which ignores its identity of aim with the work he reprobates, which twists its excellence into something different, in a vain effort to make *all* excellence agree with his own ideas and theories as to how excellence should be attained. Mr. Linton has certainly himself done admirable engraver's work in his day, but his criticisms upon that work, and the examples which he chooses as exponents of certain qualities which, in spite of other excellences, they do *not* possess, only give us further proof that though a good artist in his fashion, he is a most hot-headed and injudicious critic. The history of wood-engraving in America remains to be written by some one who shall really be a historian, and not a partisan pamphleteer. Meanwhile Mr. Linton's book is indispensable to all who are interested in the controversy and wish the documentary evidence on either side. But the young student had better not read farther than its earlier chapters, unless he wishes his brain to be muddled to no purpose. The volume is valuable to the collector, as it contains moderately good reproductions of much early and unattainable work, and many blank pages at the end, prepared for mounting proofs, an idea which might well be adopted by editors of all similar works. It should also be praised for its strong and suitable binding.

Mr. Woodberry's book [2] would have had a more appropriate title had it been called a "History of Design on Wood." Fully two-thirds of it — it is a moderate volume of about two hundred and twenty pages — are filled with an account of wood-engraving before the time of Bewick — of wood-engraving, therefore, in the days when the draughtsman was everything, and the engraver nothing but a more or less accurate mechanical workman. But from this point of view, the chapters are both interesting and instructive. They are illustrated with numerous well-known cuts, and with some that are less familiar; or, in a few instances, previously unedited. The chapter on Bewick and his successors is far too scant in comparison, and critically of little value. When more modern days are approached the author becomes hasty and slipshod, and proves himself totally unfitted for his task. Continental schools are not even noticed; even Pannamaker's name going uncited. And when current American work is spoken of we find a writer who, whether or no he has actually taken Mr. Linton for his guide, shows more than Mr. Linton's fragmentariness, narrowness, and avoidance of the real questions at issue, with none of Mr. Linton's clever epigrammatic writing, or acute if often oblique vision; none of the characteristics which make even his most unjust criticisms suggestive, amusing, or exasperating reading for those acquainted with the matter. Mr. Woodberry when he treats of current work, is merely uninformed. His chapter is ignorant and uninstructive, but it is not dangerous like Mr. Linton's. There must be a few men in the country — I could cite five perhaps — who are capable of writing a good commentary on the recent development of wood-engraving in America; at least who know so much about it, and judge it from so impartial a standpoint that they ought to be able to write about it. Why does not one of them attempt the task? It is a lesson which the public needs, and would be a vindication that our engravers deserve after being torn by the talons of Mr. Linton, and vexed by the blindness of Mr. Woodberry.

It should be added that a real history of the art must give some description of the material requirements and technical processes, which so largely define its limits and influence its results; things quite neglected in Mr. Woodberry's book.

Being by a well-known writer, and claiming to deal with a most interesting subject, Mr. Conway's book [3] will doubtless win many more readers than it deserves; a more disappointing volume it would be hard to find. Not only is it very fragmentary and disjointed in structure, but without any critical worth whatever. It is composed of a gossipy, rambling dissertation on the South Kensington collections, a still more shallow and amateurish chapter on recent art and architecture — chiefly made up of descriptions of two or three London houses — and a third chapter on the "æsthetic" village at Bedford Park; the last-named, at least, appeared originally in the pages of *Harper's Magazine*, and the others are rather below the average of ordinary magazine articles. A man who would write a good book on the South Kensington collections — or on any portion of them, for the field is a very wide one — would deserve well of art students in this country; but Mr. Conway has not done this, and his book is without value save to those who care for the lightest gossip dealing with things of art.

A laudatory article on this volume [4] appeared recently in these pages, copied from an English journal, so the reader may be supposed familiar with its aim and scope; but it does not seem to me quite to deserve the encomiums of the English critic. More than half of it is occupied with an account of Dr. Dresser's experiences while in the country — how he travelled, what he ate, and whom he saw — and such things have been described a dozen times by far more attractive writers. In spite of his professional career, and his interest as a specialist in the architecture and decoration of the country, his book has a strangely "amateurish" tone. It is fragmentary in arrangement, not over critical in judgment, and ungraphic in description. He does indeed tell us rather more than we had been told before about the architecture of the country; but still he does not tell us much, nor in a very clear way. His justifiable enthusiasm for Japanese decoration, whether in the minor arts or applied to architecture, seems — so far as one can judge from illustrations and from hearsay — to have blinded him as to the rank of Japanese building in its constructive features. Doubtless, as he shows, wooden architecture is the best for this volcanic country, and the most in consonance with the spirit of its people; so one cordially agrees with him when he condemns the efforts of Europeans to introduce their own styles — if styles they may be called — and to induce the

[1] *The History of Wood-Engraving in America*, by W. J. Linton. Boston: Estes & Lauriat.

[2] *A History of Wood-Engraving*, by George E. Woodberry. New York: Harper & Brothers.

[3] *Travels in South Kensington*, with Notes on Decorative Art and Architecture in England, by Moncure D. Conway. New York: Harper & Brothers.

[4] *Japan; its Architecture, Art, and Art Manufactures*, by Christopher Dresser. London: Longmans, Green & Co.

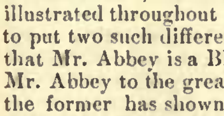
natives to follow in their wake; but when Dr. Dresser seems to rank the Japanese with the great constructive races of the world, we can hardly find his data or agree with his conclusions. As a specimen of his criticism in this direction, I may quote a paragraph on page 14, where he says, speaking of the Temples of Shiba, "Had a Gibbons been employed on the wood-carvings; had the colorist of the Alhambra done his utmost to add to forms, which in themselves are almost perfect, a new charm through the addition of pigments, and were the whole of such details subordinated to fitting places in a vast architectural edifice by the architects of the Parthenon, no more worthy effect could be produced than that of the buildings on which my eyes now rest." The first portion of this sentence is doubtless below the truth; but we can hardly find a ground for comparison, even, between Greek and Japanese building in the strict sense of the word. It is fair to say, however, that with decoration Dr. Dresser is more happily at home than with construction; his remarks on the degree of perfection here attained by Japanese artists, as well as upon the artistic causes of their success, are true and forcible if not especially novel. The most valuable part of the book is to be found in the descriptions of the modes of working, and material processes of Japanese artists. The chapter on ceramics is useful, not as showing how we may decide upon the maker and the age of any given work; but as proving for the benefit of the too-confident amateur, how difficult it is even in Japan, and how impossible for uninstructed foreigners to be certain upon either point. A good idea was to have many of the illustrations — none of which are in color — drawn and engraved by Japanese artists, thus preserving the spirit and touch as well as the mere design of their creations.

I would not have the reader conclude that this is not an interesting and instructive book; but it has been so overpraised in many quarters that disappointment will be apt to result from its inspection. It inspires us not with the idea that Japanese architecture has been adequately described, even in brief; but that it would be a good thing if some more scientific observer, and more systematic and graphic writer than Dr. Dresser would now follow in his wake.

This is not a book[1] *on* art, but what is even more valuable, a book *of* art in the truest sense of the word. Its pages are familiar to most of my readers, it may be supposed, owing to their serial publication in *Harper's Magazine*. But even those who there admired them most will hardly imagine how valuable they are as now collected in a handsome volume, beautifully printed and accompanied by many unillustrated poems besides. There has been to my knowledge no English illustrated book since the days of Blake so wholly original and excellent as this; no book, that is, which is the work of one author and illustrated throughout by a single hand. I do not intend, of course, to put two such different artists into any actual comparison, or to say that Mr. Abbey is a Blake. As Herrick is to the Prophet Job, so is Mr. Abbey to the great imaginative English artist; but to say that the former has shown himself perfectly competent to the task not only of illustrating Herrick in the usual sense of the term, but of interpreting the finest essence of his mind and sense, is high praise none the less. Through every mood of the poet's varied song — its town-bred love of rusticity, its courtly air of simplicity, its delicate pathos, its roystering, tavern gayety, its melancholy musings on time and death — the artist follows with a pencil so sure, so expressive and so sympathetic, so suggestive of all that lies beneath the text no less than of all which is definitely expressed, that we feel almost as though the spirit of Herrick himself had been born again with a different artistic endowment. As art-work proper, apart from its illustrative power, Mr. Abbey's drawing is almost always perfect. His taste is exquisite, and shows itself not only in the great variety of form and treatment he has adopted for his pages, but in his usual avoidance of all mere "decorative" effects in the interest of true pictorial style. The engraving varies in excellence but is always good and often without a fault. Mr. Alfred Parsons, to whom the book is dedicated, has contributed sundry floral designs which serve as head and tail pieces. There is but one fault to find with the get-up of this beautiful volume. The cover is rather trivial in design and far too delicate in color for a book which, when owned, is sure to be constantly handled. Issued among the crowd of illustrated holiday volumes which fill the shops at this season of the year, it should by no means be confounded with their average or even compared with the best among them. It has a high art value of an absolute sort, and should command a constant sale long after its apparent rivals have been lost to sight and memory.

M. G. VAN RENSSELAER.

THE FLOOD AT CINCINNATI.



CINCINNATI has been visited during the past week with a rise in the Ohio River which has reached a height never before known in the history of the city.

The water-works showed a height of 66′ 4″ at five o'clock, A. M., February 15, 1883. The next highest point ever reached was February 18, 1882, 64′ 3″. The river is not considered dangerous until it reaches a height of about 53′. These measurements are above low-water mark at the water-works. The river is now rapidly falling, and by Monday night most of the submerged portions will again be out of the water. Four squares of the heavy business part of the city were under water, reaching nearly to the second story, and the damage will be great to buildings, but to what extent cannot now be stated. The water stopped the engines at the water-works, and the city was left with only four days' supply of water on hand; one pump which throws a stream forty inches in diameter was started on the 16th, however, and so a total water-famine will be avoided.

The Gas-Works were entirely shut off, and so we have the experience of a great city in utter darkness; the centre of the city is, however, more or less lighted with electric-lights, whose works are above high water.

One peculiar accident caused by the flood may be noted: J. V. Nicholai had some four hundred barrels of lime stored in his yard, with a lot of plastering hair stored in an upper story; the water slacked the lime, and the heat set fire to the hair, which in turn set fire to the sheds, which were with great difficulty extinguished by the department. The fire from the above cause was renewed two or three different times.

Of course the flood causes great suffering to a large class of poor people, whose immediate wants are now being relieved by our citizens. All railroads were stopped for a short time. A great number of small frame houses were swept away, entailing a great loss on owners of small property. C.

ASSYRIAN BAS-RELIEFS AT ROME.

FROM THE STATUE OF CALIGULA.

I have been enabled by special permission to inspect personally the Assyrian bas-reliefs which were casually discovered in the subterranean vaults below the Vatican library in seven cases. They had been given to Pius IX by Signor Giovanni Benni, first dragoman of the French Consulate at Mossul in 1855, and had been altogether forgotten. They are placed in a long gallery of the library of the Vatican, where so many priceless manuscripts are preserved, and are inserted into the wall-spaces beneath the windows. They are altogether sixteen in number, of which two are inscriptions. One of the latter is especially interesting to students of Oriental archæology, inasmuch as it contains words strange to such eminent authorities as Professor Sayce, of Oxford, and Canon Fabiani, of Rome. The former gentleman (who is at present in Tunis and is expected to make some interesting studies at Carthage) visited the Assyrian bas-reliefs in the Vatican a short time ago, when he was on his way to Africa. The Commendatore C. M. Descemet, to whose courtesy and intelligent explanations I am much indebted, during my visit this morning told me that Professor Sayce began to read the larger of the two inscriptions in his (M. Descemet's) presence, and soon remarked that there were in it forms and words unfamiliar to him, and pointing to a hitherto unknown idiom or variety of the Assyrian language. Canon Fabiani is, unfortunately, not well enough at present to visit the Vatican, but tracings of the two inscriptions were submitted to him, and he at once made a remark similar to that of Professor Sayce. The smaller inscription is more legible. Both are cuneiform, but the larger differs in the form of the letters, as well as of the words, from those with which the erudite are familiar. Copies of them, as well as of what may be called the pictorial bas-reliefs, have been sent to the well-known M. Oppert, at Paris, who considers them of high interest.

I was accompanied this morning by an artist, whose painter's eye was immediately struck by the spirit and faithfulness of many of the delineations. There is, among many other instances, the outstretched arm of an archer, who has just shot off his arrow and is grasping his bow, admirable for vigor and truth of modelling. Also, a kneeling camel — a most difficult animal to draw, as all painters know who have tried him — is portrayed to the life.

The first bas-relief we come to on entering the gallery represents the Assyrian divinity Nisroc. The god, who is eagle-headed, bears the symbols of the four elements; he carries a pine cone in one hand to represent fire, a sort of bucket for water in the other, has large wings to indicate the dominion of the air, and the earth is beneath his feet. Another sculpture represents a king adoring the sacred tree, or tree of life, the leaves on which are identical in form with those on a similar tree depicted in the illustrations to Sir Henry Layard's well-known work on Nineveh. Also a group of grooms or servants holding horses bear many points of resemblance to the illustrations in Sir H. Layard's book. For example, the trappings and adornments of the horses are nearly identical in both. There is an interesting group of persons passing a river — presumably the Tigris — on a raft. It consists of two women, a soldier, and the ferryman. All the passengers sit with their faces forward, seen in profile by the spectator, while the ferryman stands behind them and steers with a long pole or oar. Another group seems to represent

[1] *Selections from the Poetry of Robert Herrick*, with drawings by Edwin A. Abbey. New York, Harper and Brothers.

travellers on a journey. The foremost figure carries a sack or bag slung behind him and something like a small chest on his head, while his companion — a female — bears a child astride her shoulders in the exact attitude with which Eastern travellers are familiar at the present day. Both figures are nude. The sculpture in which the kneeling camel occurs represents a field of battle after the fight is over. Dead and wounded lie on the ground, and the camel is about to be laden with their spoils. To the same category of warlike representations belong the archers alluded to above, of whom some are shooting off arrows, while another man holds a huge clypeus or shield, behind cover of which the bowmen take aim, and also the very remarkable bas-relief portraying the siege of a city, with scaling ladders, and a spirited presentment of the killed and wounded being hurled from the battlements. In the costume and armor of the soldiery, and the general conception of methods of warfare, this sculpture singularly reminded me of some of the scenes on the Empress Matilda's famous tapestry at Bayeux. But undoubtedly the superiority of design and perspective is largely on the side of the Assyrian artist. It is noticeable that several of the faces portrayed belong to a high and even beautiful type of humanity — especially fine specimens, one might say, of the Caucasian race — while others show a more Arabian or Semitic type. In fact, M. Descemet considers one of the faces to be distinctively Jewish. — *London Standard.*

NOTES AND CLIPPINGS.

A Co-operative Painting Establishment. — In a lecture in New Haven lately, Hon. Henry C. Robinson of Hartford, gave this account of the house-painting establishment of LeClaire & Co., Paris: When young Jean LeClaire was an apprentice, his master, Traziere, made up his mind that he would adopt the co-operative system. He met with much objection on the part of many business men of France, and even the press; but in one year he was able to give $50 each to the workmen, in addition to their stipulated salaries. His doctrine was laid down in one of his published utterances, in which he said that every workman should have the means to support himself and family, without being a burden to any one. He died in 1872, and was followed to his last resting-place by thousands of workmen and tradesmen. He left a fortune of over $250,000, and was able, to the last year of his business life, to distribute over $10,000 among 600 workmen. The establishment is at present run by a board of ten directors selected from the men employed. The more immediate control of the corporation is in the hands of two of the directors, who are called the managing partners, and who receive a sufficient salary. Current wages are paid to the men, and work is performed at current prices. Connected with the establishment is a mutual benefit association. Each workman, after 20 years of service and at the age of 50, receives a pension of $200 for life, and at his death his widow receives $100 during her life. Whatever money is contributed to the firm by any one of the workmen is allowed an interest of 5 per cent. Thus in addition to the pecuniary advantages, it also stimulates the ambition of the workmen, teaches them the principles of legislation, fits them for the best citizenship, and promotes true manliness.

A Derbyshire Mine. — The proverbial uncertainty of mining adventures has just received a somewhat startling illustration in Derbyshire, a county in which the vicissitudes of mining have on more than one occasion been strikingly exemplified. The Magpie mine, at Sheldon, near Blakewell, is in the Peak district, which yields a large quantity of lead ore, and has been explored from time immemorial. This particular mine has been worked for some hundreds of years with short intervals of rest. In 1869 it was taken in hand by two well-known Sheffield gentlemen, who subsequently formed a limited company to carry on the undertaking. The mine had always been a wet one, however, and the cost of keeping down the water has hitherto swallowed up the profits made. Pumping was commenced in 1870 and continued for two or three years, after which it was resolved to drive an adit in order to effect the drainage of the workings. This level was commenced in 1873 and finished in 1881. It is nearly 2,000 yards long, 7 feet high, 6 feet wide, and cost about £14,000. It keeps the workings dry to a depth of 196 yards, and takes off about 1,400 gallons a minute. During the whole of these expensive operations no dividends have been paid to the shareholders — indeed, only 22 tons of lead ore were raised during the whole of 1881, although more was got in 1882. Patience and perseverance have been rewarded at last, however, for the workings have now struck a vein of blende (yielding zinc ore) five feet in thickness, and of excellent quality. According to the captain of the mine, there are at least 50,000 tons of the blende within the limits of the workings, so that the plucky adventurers have, at last, some prospect of receiving an adequate return for their long-continued and large outlay. — *Ironmonger* (*London, England*).

Head-dress of the Statue on the Capitol. — Jefferson Davis seems to be writing letters for newspaper publication with unaccustomed frequency. One of his latest explains how the Goddess of Liberty on the Capitol at Washington came to have an Indian head-dress instead of the cap of liberty. He writes: "When in the Senate I was a member of the committee appointed to adopt a plan for the extension and improvement of the Capitol. When the plan was adopted and reported the functions of the committee were at an end. Subsequently I was Secretary of War, and when the appropriation was made for the extension of the Capitol, it was by the act put under the charge of the War Department to supervise and direct the execution of the work. To aid in the performance of that duty I appointed Captain M. C. Meigs of the Engineer Corps, superintendent of the construction. Several of the most distinguished American statuaries were invited to accept orders, among them Mr. Hiram Powers, who submitted for the dome of the Capitol, a cartoon to represent America by a colossal female figure, on the head of which was the 'liberty cap.' To this cap I objected because it was among the Romans the badge of an emancipated slave, and as the people of the United States were born freemen, it was held to be inappropriate to us. Mr. Powers yielded to the objection, and designed a head-dress of feathers for the figure. This was accepted. As a question of art I will leave the discussion to the critics who may impugn the good taste of Mr. Powers, merely remarking that the feathers seemed to me, in view of the aboriginal inhabitants, appropriate to a statue typical of America." — *New York Times.*

Paint for Floors. — A paint for floors which economizes the use of oil-colors and varnish is described in the German technical press as having been composed by Herr Mareck. It is remarked that this paint can also be used on wood, stone, etc. For flooring, the following mixture has been found applicable: 2 ½ oz. of good clear joiners' glue is soaked over night in cold water. It is dissolved, and is then added (being constantly stirred) to thickish milk-of-lime heated to boiling point, and prepared from 1 lb. quick-lime. Into boiling lime is poured (the stirring being continued) as much linseed oil as becomes united by means of saponification with the lime, and when the oil no longer mixes there is no more poured in. If there happens to be too much oil added it must be combined by the addition of some fresh lime-paste. For the quantity of lime previously indicated, about half a pound of oil is required. After this white thickish foundation-paint has cooled, a color is added which is not affected by lime, and in case of need the paint is diluted with water, or by the addition of a mixture of lime-water with some linseed oil. For yellowish-brown or brownish-red shades about a fourth part of the entire bulk is added of a brown solution obtained by boiling shellac and borax with water. This mixture is specially adapted for painting floors. The paint should be applied uniformly, and is described as covering the floor most effectually, and uniting with it in a durable manner. But it is remarked that it is not suitable for being used in cases where a room is in constant use, as under such circumstances it would probably have to be renewed in some places every three months. The most durable floor-paint is said to be that composed of linseed-oil varnish, which only requires to be renewed every six or twelve months. It penetrates into the wood and makes it water-resisting; its properties being thus of a nature to compensate for its higher cost in proportion to other compositions used for a similar purpose. Its use is particularly recommended in schools and work-rooms, as it lessens dust and facilitates the cleaning of the boards. — *The Builder.*

Dangerous and Unhealthy Industries in France. — The French Government has, on the report of the Minister of Commerce, and in concurrence with the Superior Commission appointed by law, issued six decrees forbidding the employment of children and young women under age, under the following circumstances, and for the specified reasons:—

Manufacture of salicylic acid by means of carbonic acid, on account of the corrosive emanations. Manufacture of celluloid and similar products, on account of the injurious fumes and dangers of explosion, or of burning; and for the last two reasons, in works for fashioning celluloid. Manufacture of chloride of sulphur, on account of the injurious emanations.

It is also forbidden to employ boys under sixteen, and girls under eighteen, for supplying motive power to hand-looms; and the work of young women under age is prohibited in rag works that are not properly ventilated.

Boys of twelve to fourteen, and girls of twelve to sixteen years, may not be employed to draw loads in the public streets. Boys and girls over twelve may draw loads in manufactories, works, shops, and yards, provided it be on level ground, and that the load, including vehicle, do not exceed two hundred-weight; and only boys from fourteen to sixteen years old may draw a load in the streets, provided it do not exceed one hundred-weight.

Children may not be employed in operations in which dust is disengaged, in works where horn, bone, and pearl are worked dry. Nor may they be employed at all in such works when dust is freely disengaged.

Lastly, plumbers and tilers are forbidden to employ children in work executed on the roofs of houses. — *Journal of the Society of Arts.*

Gas-Meters as Spreaders of Fire. — In most buildings designed for multiple tenancy, like great apartment-houses and the capacious office-buildings which comprise so large a part of the business portion of a city, it is customary to provide a separate gas-meter for each room or suite of rooms. These meters are commonly placed in closets and out-of-the-way corners, and are very apt to be surrounded with much combustible matter. The connections of meters with the gas-pipes are usually, if not always, of lead, a metal that is easily fusible, and the solder with which the plates of the meter are joined together yields even more readily to heat. Let a fire break out in a building containing, as many buildings do, a score or more of these fragile fire-feeders, and the hot air sweeping in advance of the fire will quickly melt the lead or solder. The outpouring gas fills the building with the explosive atmosphere which hastens the spread of the flames and keeps up an inexhaustible supply of fuel. Such burning of gas jets, sometimes of great size, are to be seen after almost every city fire, when nothing is left of a building but blackened and broken walls. The gas poured into burning buildings through such openings doubtless helps materially to account for the surprising suddenness with which many great buildings have been swept by flames, and in all cases the outflow of gas must seriously counteract, if it does not altogether thwart, the efforts of the firemen. The remedy for this great evil is not so easy to point out. It is obvious that where a multitude of meters are to be distributed through a building, they should be more securely incased and provided with infusible connections, or some means should be devised whereby the gas-supply shall be automatically shut off whenever the temperature rises so as to imperil the integrity of the meter. There should be also near the outer door and readily accessible to firemen some means by which the connection of the house with the gas-main in the street can be quickly closed. There is clearly an opportunity here for useful and profitable invention. — *The Metal Worker.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents herementioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

271,587. ORNAMENTATION OF BRICK, TILE, ETC. — James C. Anderson, Highland Park, Ill.

271,590. ORNAMENTATION OF BRICK, TILE, ETC. — James C. Anderson, Highland Park, Ill.

271,591. METHOD OF PREVENTING SALTPETRE-EXUDATIONS UPON FACING-BRICK. — James C. Anderson, Highland Park, Ill.

271,595. PIPE-WRENCH. — Seymour A. Bostwick, Chelsea, Mass.

271,614. AUTOMATIC FLUSH-VALVE. — Harvey C. Lowrie, Denver, Col.

271,619-650. DOOR-SPRING. — Ira Moore, New York, N. Y.

271,652. SCREW-CUTTING DIE. — Joseph Müller, Nacogdoches County, Tex.

271,662-663. LOCK. — Solomon P. Stoddard, New York, N. Y.

271,669. AUTOMATIC FIRE-EXTINGUISHER. — Caleb C. Walworth, Boston, Mass.

271,678. SAFETY HOD-ELEVATOR. — Leonard Atwood, New York, N. Y.

271,681. HOISTING-MACHINE. — James Boyd, St. Paul, Minn.

271,687. WATER, GAS OR DRAIN PIPE. — John P. Culver, Tucson, Ariz.

271,696. LEAD SASH-BAR. — Alphonse Friedrick, Brooklyn, N. Y.

271,697. PROCESS OF BUILDING LEAD-SASH FOR GLAZING PURPOSES. — Alphonse Friedrick, Brooklyn, N. Y.

271,702. LATHE-REST. — George O. Griggs, St. Louis, Mo.

271,709. HAMMER. — Henry O. Hooper, Fresno, Cal.

271,716. AIR-COOLING APPARATUS. — Hermann Kropff, New York, N. Y.

271,718. WINDOW-CORNICE. — Edward Kügemann, Chicago, Ill.

271,723. — STEAM-RADIATOR. — H. Macdonald, Detroit, Mich.

271,731. BUSH-HAMMER. — August Nelson, Kent, O.

271,746. CENTERING-GAUGE. — Augustus Sequeira, Hartford, Conn.

271,752. WATER-CLOSET. — Darius Wellington, Boston, Mass.

271,753. TENON AND TURNING CHUCK. — Barton A. Whitsett, Lebanon, Ind.

271,776. PORTABLE BUILDING. — Virgil W. Blanchard, New York, N. Y.

271,796. FIRE-ESCAPE LADDER. — Elmer A. Converse, Monticello, O.

271,802. FIRE-ESCAPE. — Hugh H. Craigie, Stamford, Conn.

271,809. FIRE-ESCAPE. — Richard J. Dearborn, Boston, Mass.

271,814. PAINT-BRUSH PROTECTOR. — Henry Dischinger, Elmore, O.

271,854. ILLUMINATING-ROOF, ETC. — Joshua K. Ingalls, Glenora, N. Y.

271,873. BRICK-MACHINE. — John H. Koneføs, Quincy, Ill.

271,875. MACHINERY FOR MOULDING BRICKS AND TILES. — Thos. Le Poidevin, Guernsey, England.

271,881. SAFETY-LIFT. — Moritz Martin, Bitterfeld, Prussia, Germany.

271,901. DETERGENT OR COMPOUND FOR REMOVING PAINT. — Albert Munder, Philadelphia, Pa.

271,905. SASH-HOLDER. — Manning L. Nix and Stephen McClelland, Paris, Tex.

271,915-917. WATER-CLOSET. — Charles F. Pike, Philadelphia, Pa.

271,918. DOOR-LOCK. — Oliver E. Pillard, Cambridgeport, Mass.

271,946. SPRING-HINGE. — Alfred B. Tanner, New Haven, Conn.

271,950. BUILDING-CEMENT. — Jas. E. Trask, Salem, Mass.

271,960. BRUSH. — Isaac Cady Wells, Three-Mile Bay, N. Y.

271,962. LOCK. — Joseph P. White, Savannah, Ga.

271,973. COMMERCIAL PUTTY. — Robert W. Davis, Elmira, N. Y.

271,980-981. DOOR-HANGER. — Geo. W. Hay, Syracuse, N. Y.

271,983. NAIL. — William G. Howell, Philadelphia, Pa.

272,007. SAW-HANDLE. — Jas. R. Woodreugh, Cincinnati, O.

272,013. FIREPLACE LINING. — James Adair, Sewickley, Pa.

272,020. TRAP. — Joseph Benner, Philadelphia, Pa.

272,031. BARN-DOOR HANGER AND RAIL-BRACKET. — William Cronk, Havana, N. Y.

272,032-033. INLAID WORK AND PROCESS OF PRODUCING THE SAME. — Wm. C. Edge, Newark, N. J.

272,037. DOOR-LOCK. — William H. Flinn, Nashua, N. H.

272,038. WOOD-CUTTING MACHINE. — James Lorenzo Gage, Chicago, Ill.

272,040. WATER-FAUCET. — John Graham, Chicago, Ill.

272,047. TRAMMEL. — William D. Herschel, Philadelphia, Pa.

272,068. WINDOW-SCREEN. — Andrew W. Lovejoy, Rochester, N. Y.

272,103. FIRE-ESCAPE. — Harriet R. Tracy, New York, N. Y.

272,125. FIRE-ESCAPE. — John A. Edmonds, Dover, Del.

272,148. SNOW-GUARD FOR ROOFS. — Chas. A. Neuert, Boston, Mass.

272,158. METHOD OF AND APPARATUS FOR VENTILATING BUILDINGS, SHIPS, VESSELS, RAILWAY-CARRIAGES AND THE LIKE. — Thomas Rowan, London, Eng.

272,163. LADDER. — Chas. B. Shaver and Silas C. Schofield, Freeport, Ill.

272,190. LUMBER-EDGING MACHINE. — Henry R. Barnhurst, Erie, Pa.

272,193. PIPE-VISE. — Alfred Beard, Danville, Ill.

272,196. WATER-CLOSET VALVE. — Cornelius Birkery and Henry S. Lord, Hartford, Conn.

272,213. WEATHER-STRIP. — Irvin Coppock, Barclay, Kan.

272,224. BRICK-MAKING MACHINE. — Michael Fitzpatrick, St. Louis, Mo.

272,259. FIRE-ESCAPE. — Ray Howland, Brooklyn, N. Y.

272,274. STOP-CHAMFER PLANE. — Joseph Lee, Garnerville, N. Y.

272,279. HEADED LUMBER-RULE. — Edward T. Lufkin, Cleveland, O.

272,296. CONSTRUCTION OF JAILS, ETC. — Samuel M. McLean, Modesto, Cal.

272,316. SHINGLE-SAWING MACHINE. — Willis J. Perkins, Grand Rapids, Mich.

272,320. BRICK-TONGS. — David Ralston, Troy, N. Y.

272,326. RADIATOR FOR FURNACES. Dwight S. Richardson, Brooklyn, N. Y.

272,336. DOOR-BELL. — Worthington Scranton, New Haven, Conn.

272,383. ILLUMINATING VAULT-COVER OR GRATING-TILE. — Thaddeus Hyatt, New York, N. Y.

272,389. FIRE-ESCAPE. — Charles F. Spencer, Rochester, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report seventeen permits have been granted, the more important of which are the following: —

J. F. Obrecht, two-st'y brick stable, in rear of n s Weber St., e of Light St.

Owen McKenna, three-st'y brick building, e s McKim St., between Chase and Eager Sts.

Jacob Timanus, three-st'y brick building, e s Pennsylvania Ave., between Hoffman and Dolphin Sts.

St. Martin's Church, three-st'y brick school-house, e s Fulton St., s of Fayette St.

Wendell Depple, two-st'y brick stable, e s Bond St., between Bank and Eastern Aves.

Winfield C. & Geo. Peters, 2 three-st'y brick buildings, e s State St., between Mulberry and Saratoga Sts.

Chas. Burton, 6 three-st'y brick buildings, w s Rutter St., s of Townsend St.

Boston.

BUILDING PERMITS. — *Brick.* — *Tremont St.*, *Nos.* 467-469, Ward 16, for Mary S. Knowlton, four-st'y flat dwell. and store, 24' x 46'; Vinal & Dodge, builders.

Castle St., *No.* 154, cor. Pearl St., Ward 16, for Henry E. Wright, three-st'y flat manufactory and store, 10' 6" and 20' 6" x 45'; Chas. E. Day, builder.

Centre St., *No.* 16, Ward 21, for Louis Prang, three-st'y flat dwell., 23' 5½" x 63' 9"; ell, 15' 8" x 26' 2"; Chas. Chipman, builder.

Centre St., *No.* 16, Ward 21, for Louis Prang, three-st'y flat dwell.. 23' 10½" x 63' 9"; ell, 15' 8" x 26' 2"; Chas. Chipman, builder.

Wood. — *Mills St.*, near Dale St., Ward 21, for Benj. F. Bean, two-st'y pitch dwell., 20' x 30'; ell, 14' x 16'; Benj. F. Bean, builder.

East Eighth St., rear, near W St., Ward 14, for Wm. B. Smith, storage boats, 25' x 65'; Wm. B. Smith, builder.

Upton Court, near Western Ave., Ward 25, for J. O. Whidden, one-st'y flat dry-house, 20' x 26'.

Gardner Ave., Ward 21, for John Roessle, storage wagons, 25' x 60'; Frank Scheil, builder.

Brooklyn.

ARMORY. — The Board of Supervisors has adopted a resolution to ask the State to erect an armory at a cost of $50,000, on a site to be given by the county, for the Gatling Battery and for brigade head-quarters.

BUILDING PERMITS. — *Rutledge St.*, n s, 82' e Bedford Ave., 2 two-st'y brownstone front dwells.; cost, each, about $4,200; owner, R. Tayler, 111 Clymer St.; architect and builder, J. H. Devoe.

Poplar St., n w cor. Poplar Pl., four-st'y brick building, felt and cement deck roof; cost, $47,000; owners, Brooklyn Children's Aid Society, 61 Poplar St.; architect, M. J. Morrill; builders, J. H. Stevenson and J. S. McRae.

Woodbine St., *No.* 71, three-st'y frame dwell., tin roof; cost, $3,800; owner, Cornelia Suydam, Bushwick Ave., near Jacob St.; architect and builder, F. Marryatt: mason, J. Lombat.

Evergreen Ave., n w cor. Woodbine St., two-and-a half-st'y frame dwell., tin roof; cost, $4,200; owner, Maria Booth, 67 Woodbine St.; architect, etc., same as last.

Adams St., *Nos.* 14½ *and* 16, s s, 137' 6" e Broadway, 2 two-st'y frame tenements, tin roofs; cost, each, $2,500; owner and builder, Chas. Meyer, 51 Varet St.; architect, T. Engelhardt.

Herkimer St., n s, 75 w Ralph Ave., two-st'y frame tenement, gravel roof; cost, $2,500; owner, G. R. Waldren, 1906 Atlantic Ave.

ALTERATIONS. — *Atlantic Ave.*, *Nos.* 139, 141 *and* 143, two-st'y brick extension, etc.; cost about $3,000; owner, Jos. O'Brien & Co., on premises; architect, T. F. Houghton.

Cincinnati.

FACTORY. — Geo. C. Winchel & Co. are to build a new factory on the corner of Bank and Riddle Sts., 100' x 150', five-st'y high; cost, $40,000; Geo. Brink, architect.

THE APPROACHING SEASON. — All the architects' offices seem full of work, and the prospects for a busy and profitable season are apparent to all interested in building. We hear of no labor troubles, and therefore nothing is expected from this source to mar the pleasant picture before us.

BUILDING PERMITS. — Jos. Tenhaudfet, three-st'y brick dwell. on State Ave.; cost, $5,000.

H. Kister, three-st'y brick dwell., Bank St.; cost, $1,000.

Anton Thurn, three-st'y brick dwell.; cost, $4,000.

Jos. C. Harrell, three-st'y brick dwell., 292 West Ninth St.; Chas. Crapsey, architect; cost, $7,000.

Belmont & Overbeck, two-st'y brick building, Jefferson St., near Calhoun St.; cost, $3,500.

J. H. Banning, three-st'y brick dwell., Baymiller St., near Ninth St.; cost, $3,500.

John Jones, two-st'y frame building, Western Ave., near Spring St.; cost, $2,000.

Jas. A. Armstrong, 2 five-st'y brick and stone stores, Third St., near Elm St.; Henry Bevis, architect; cost, $30,000.

Eight permits for repairs; cost, $57,000.

Cleveland.

FINE-ART ACADEMY. — The Academy of Art will erect a building, cor. of Erie and Chestnut Sts., 100' x 100', three stories high, to cost $50,000; to be used as an academy, studios, and art-rooms.

BANK. — The Commercial Bank will build an elegant building cor. Bank and Superior Sts. this spring, 100' front; cost, about $75,000.

THEATRE. — A new theatre will be built this year on the north side of the public square; cost, $100,000; Wick & Sons are the owners; A. Koehler, architect.

HOUSES. — Dwelling-house on Sibley St., for Mr. Hall; cost, $7,500; E. Cass, contractor; Coburn & Barnum, architects.

Dwelling for Frank Aldrich on Sibley St.; cost, $7,500; E. Cass, contractor; Coburn & Barnum, architects.

Detroit.

HOUSES. — Brick dwell., No. 18 Willis Ave.; cost, $5,000; A. C. Varney, architect.

Frame house, Willis Ave.; cost, $3,500; J. D. Baker, contractor.

Frame house, No. 415 Turnbull Ave.; cost, $4,000; Durst Bros., contractors.

Brick dwell., No. 205 East Larned St.; cost, $5,000; A. H. Adams, contractor.

Frame house, No. 164 Locust St.; cost, $2,700; Lyman Riggs, contractor.

MILL. — Addition to mill, Franklin St.; cost, $3,500; Dewey & Abell, contractors.

FACTORIES. — Union Chair Co., brick factory; cost, $18,000; A. C. Varney, architect.

National Iron Works, factory; cost, $10,000; A. C. Varney, architect.

BUILDING PERMITS. — Repairs to Telegraph Block, Griswold St.; cost, $13,000; J. Hess, architect.

New York.

APARTMENT-HOUSE. — For Mr. E. H. Just, a first-class six-st'y apartment-house, 100 feet square, is to be built on the s w cor. of Seventh Ave. and One Hundred and Twenty-second St. The front will be of ornamental brick, and the top floor will contain a restaurant-kitchen. Mr. Mortimer C. Merritt is the architect.

EXTENSION. — Mr. Theodore Moss, 543 Madison Ave., is to have a 40-foot extension added to his residence, which will contain a dining-room and library. The cost will be about $10,000; Messrs. Smith & Kelly are the architects.

RUMORS. — Among some of the important buildings mooted are another united bank building, to be built by the Manhattan and the Merchant's National Bank, Nos. 40 and 42 Wall St., running through to Pine St., with a frontage of 80' on both streets.

A building, it is also said, will be erected on the Park Theatre site, by Brooks Bros.; and it is pretty well settled that the Mills building will be extended.

Mr. Stokes and others have applied to Mr. Wm. H. Vanderbilt for a lease of the Madison Square Garden property, with the idea of erecting thereon a colossal building, but the matter is as yet immature.

TELEGRAPH OFFICES. — The Western Union Telegraph Co. propose erecting a building at Nos. 14 and 16 Broad St., for the use of the Cable Department. Plans have not yet been drawn.

THEATRE. — Annie L. McCahill has filed a plan for a theatre to be erected at Nos. 443, 445 and 447 Third Ave., and No. 206 East Thirty-first St. The building will have a frontage of 60' 1", and a depth of 120'. It will be three stories high, with a brick front. The cost will be $50,000.

BUILDING PERMITS. — *West Forty-seventh St.*, *No.* 465, five-st'y brownstone flat, tin roof; cost, $18,000; owners, architects and builders, Jas. B. Gillie, 538 West Fifty-first St., and Alex. Walker, 447 West Fifty-sixth St.

West Forty-seventh St., *No.* 236, eight-st'y brick storage warehouse, tin roof; cost, $20,000; owners, Morgan & Bro., 234 West Forty-seventh St.; architect, Jos. M. Dunn.

Seventy-fifth St., s s, 100' w First Ave., two-st'y brick bakery and stable, tin roof; cost, $9,000; owner, Geo. F. Dooste, 245 East Seventy-fifth St.; architect, Wm. Jose.

Grand St., *No.* 387, five-st'y brick store, tin roof; cost, $12,000; owners, Adolph and Emanuel Alexander, 387 Grand St.; architect, Julius Boekell.

East Seventy-seventh St., *No.* 406, four-st'y brick tenement, tin roof; cost, $14,500; owner, John B. Dingeldein, 351 East Seventy-seventh St.; architect, John Brandt.

East Seventy-fifth St., *No.* 317, four-st'y brick tenement, tin roof; owner, Patrick Ducey, 317 East Seventy-fifth St.; architect, A. T. Wilson.

One Hundred and Thirty-fifth St., s s, 150' w Eighth Ave., 3 four-st'y brick tenements, tin roofs; cost, each, $15,000; owner, Patrick Whelan, One Hundred and Thirty-eighth St., cor. Southern Boulevard; architect, Frank E. Verder.

One Hundred and Thirty-fourth St., n s, 150' w Eighth Ave., 2 four-st'y brick tenements, tin roofs; cost, each, $15,000; owner and architect, same as last.

West Thirty-seventh St., *No.* 453, five-st'y brick tenement, tin roof; cost, $16,000; owner and builder, James McLaughlin, 453 West Thirty-seventh St.; architect, John Seaton.

Fifty-sixth St., s s, 100' w Second Ave., 3 five-st'y brick tenements, tin roofs; cost, each, $13,000; owner, Jas. Williams, 412 East Fifty-seventh St.; architect, A. B. Ogden.

One Hundred and Fifty-eighth St., s s, 100' w Courtland Ave.; two-st'y frame dwell., tin roof;

cost, $2,750; owner, Robt. H. Schaufelberger, Courtland Ave., cor. One Hundred and Fifty-sixth St.; architect, Louis Falk; builders, John Diehl and Fred. Schwab.

Morris Ave., n e cor. One Hundred and Fifty-fifth St., four-st'y brick factory, tin roof; cost, $10,000; owner, Mary A. Dunham, East Chester, N. Y.

ALTERATIONS. — *Water St., Nos. 97 and 99*, upper st'y divided into two stories; cost, $8,000; owner, Frederick Robert, 22 West Twenty-sixth St.; architect, H. Edwards Ficken.

Bowery, No. 99, four-st'y brick extension; cost, $7,500; owner, John R. Ackerman, 236 Warren St., Brooklyn; builders, Elward Smith & Co.

Fifth Ave., n w cor. Twentieth St., four-st'y brick and brownstone front extension; also one-st'y extension, tin roof; cost, $70,000; lessees, Herter Bros., 18 East Eighteenth St.; architect, Wm. Schickel.

West Tenth St., No. 164, raise attic; and three-st'y brick extension; cost, $4,000; owner, Thos. Parsons, on premises.

Second Ave., s w cor. Seventh St., new flat roof and change partitions on fourth floor; cost, $4,000; owner, Jacob H. Miller, 115 Second Ave.; architect, Jobst Hoffmann.

West Twenty-third St., No. 144, is to be altered from a residence into a store, at an expense of about $10,000, from designs of Messrs. D. & J. Jardine. Mr. Jas. A. Ruthven is the owner.

Philadelphia.

HOUSES.— The outlook for the erection of dwelling-houses during the coming spring is very encouraging. One of the most extensive builders, Mr. John M. Sharp, in addition to the vast number of first-class dwellings he has already built, is about to commence an operation at Twenty-fourth and Master Sts., where he proposes to build one hundred and one (101) houses, to be of brick with brownstone and blue-and-white marble trimmings; total cost of houses to be about $200,000. He also contemplates the erection on the lot at n e cor. of Fifteenth and Mt. Vernon Sts., of thirteen first-class dwells.

Other builders of prominence also have in view extensive operations which will be mentioned hereafter in detail.

BUILDING PERMITS.— *Thirteenth St.*, w s, s of Locust St., 2 three-st'y dwells., 22' x 82'; Robertson & Bryan, contractors.

Fifth St., s of Lehigh Ave., and e s Reese Street, 5 three-st'y dwells., 16' x 44', and 4 two-st'y dwells., 14' x 32', and two-st'y stable, 26' x 30'; Fred Lambrecht, contractor.

South Twentieth St., No. 1012, one-st'y stable, 16' x 22'; Isaac Graham, contractor.

Chestnut St., No. 1037, three-st'y store, 28' x 80'; P. H. Somerset, contractor.

Fourth St., Nos. 141 and 143, storage shed, 65' x 100'; Jno. Lucas & Co., owners.

North Third St., Nos. 710 and 712, two-st'y storehouse, 24' x 60'; W. H. Cooper, owner.

Jefferson St., s e cor. Mansion Ave., 2 three-st'y dwells., 17' x 30'; Patrick Farley, owner.

Eleventh St., n w cor. Race St., five-st'y factory and store building, 66' x 110'; Kister & Owen, contractors.

Jefferson St., s w s, between Mansion Ave. and Hamilton St., 3 three-st'y dwells., 17' x 30'; Alex. McCormick, owner.

Mervine St., w s, n of Somerville St., 2 two-st'y dwells., 15' x 40'; David Murtha, owner.

North Twelfth St., No. 1511, fourth-st'y addition to dwell., 15' x 28'; P. H. Somerset.

Jasper St., No. 2212, three-st'y warehouse, 18' x 36'; Thos. Neeley, owner.

Twenty-second St., cor. Stewart St., two-st'y foundry, 40' x 120'; Jas. B. Doyle, contractor.

Juniper St., n of Reed St., two-st'y carriage-house, 20' x 20'; J. H. Lingo, contractor.

Ringgold St., s from Parrish St., 6 two-st'y dwells., two 16' x 38', and four 14' x 38'; Jas. Beatty & Son, contractors.

Pemberton St., No. 634, two-st'y shot-factory, 19' x 50'; Stephen P. Rush, contractor.

St. Louis.

BUILDING PERMITS. — A. Nedderhut, two-st'y brick warehouse; cost, $2,500; sub-let.

John Barry, two-st'y brick store and dwell.; cost, $3,600; Paulus & Wiedemueller, contractors.

F. W. Gaertner, two-st'y brick dwell.; cost, $2,900: Louis Yaeger, contractor.

Felix Goldhuhle, two-st'y brick tenement; cost, $3,000; Schaper, architect; Joseph Schuster, contractor.

Gerard B. Allen, three-st'y brick factory; cost, $15,000; Samuel Robbins, contractor.

Gerard B. Allen, one-st'y brick factory; cost, $7,000; Samuel Robbins, contractor.

B. W. Alexander, three-st'y brick store; cost; $20,000; Geo. I. Barnett, architect; sub-let.

Tutt & Louderman, five-st'y brick store; cost, $133,600; Major Lee, architect; Weber & Vonesdren, contractors.

R. B. Sheridan, two-st'y brick dwells.; cost, $6,500; Thos. Gugerty, contractor.

Louis Obert, two-st'y brick ice-manufactory; cost, $10,000; Hermann & Schumacher, contractors.

Toledo, O.

The recent severe weather has put a temporary quietus on building matters in this latitude. The outlook for coming season is simply fair, not over-promising.

It is understood that plans are being prepared in Chicago by the architect for Mutual Life Insurance Co., of Hartford, who own the Hall Block property, for a three-st'y brick and stone building, to occupy the site of rest of Hall Block, being about 180' on St. Clair St., by 120' on Jefferson St.; the building to be for wholesale stores.

ROLLING-MILL.— The building for the Licking Rolling mill, to be established here, is under way and is located in East Toledo. It will be a wooden structure, heavy trussed roof, on large oaken posts, and being open at sides. It will cover an area of about 100' x 362'; the work is being done by Oramer & Co., at a cost of about $12,000; there will be boiler-shops, foundry and machine-shop, offices, etc., costing $8,000 or $10,000 additional, which it is expected will be undertaken in early spring.

Washington.

HOUSES. — Messrs. Gray & Page have just given out the contract for building a house for Lieutenant C. J. Train, on Connecticut Ave., between Q and R Sts., at a cost of $8,500; Burdett being the builder. The house will have a frontage of 25 feet; it will be three stories high.

On N St., between Nineteenth and Twentieth Sts., n w, a house is being built for Miss Dayton, from designs by Mr. Carl Pfeiffer, architect, New York. The house will be three stories high. Messrs. Gray & Page are superintending the building.

BUILDING PERMITS issued since last report: —

Three-st'y brick dwell., 49' x 70', is to be built on cor. of Connecticut and Rhode Island Aves., for D. R. McKee, at a cost of $22,000; Gray & Page are the architects, and W. C. Morrison is the contractor.

2 three-st'y brick dwells., 32' x 36', to be built on M St., near Twenty-second St., n w, for John Savoy; cost, $5,000.

Two-st'y brick dwell., 22' x 58', to be built on A St., s e, for Bernard Kerman; cost, $2,500.

Two-st'y brick, 16' x 48', to be built on North Carolina Ave., s e, for I. G. Kimble; cost, $2,600; Holtzclan & Hepburn, builders.

Extension of the Portland Flat, 36' x 110', six stories high, at the intersection of Vermont Ave. and Fourteenth St., n w; cost, $72,000; Cluss & Shultz are the architects.

Two-st'y brick, 16' x 32', to be built on New Jersey Ave., n w, for Patrick Dillon; cost, $2,200; C. A. Didden, architect.

2 two-st'y and basement brick dwells., 16' x 32', for R. G. Campbell; cost, $5,000; to be built on R St., n w; Jno. G. Meyers, architect, and Jno. F. Comgan, builder.

2 two-st'y brick dwells., 16' x 32', to be built on I St., s, for Henry F. Eaton; cost, $2,500; Henry Eaton, builder.

10 two-st'y brick dwells., 12' 6" x 32', to be built on n w cor. Tenth and U Sts., for A. McIntosh & Co.; cost, $7,000.

3 two-st'y brick dwells., 16' x 38', to be built on A St., n e, for D. B. Groff; cost, $6,000.

2 two-st'y and basement brick dwells., to be built on Penn. Ave., s e, 25' x 32', for John E. Herril; cost, $7,000; Dessee & Co., architects.

General Notes.

ALBANY, N. Y. — It is said that Mr. R. W. Gibson, of this city, and Mr. H. H. Richardson, of Brookline, Mass., are the competing architects for the new cathedral, which it is proposed to build on Swan St., at a cost of over $100,000.

Governor Cleveland has signed the bill appropriating $35,000 for the new city-hall.

ALTOONA, PA. — Mr. J. Schenck will build an opera-house to cost $65,000.

ATHOL, MASS. — A. F. Tyler is making active preparations for the foundation of his new steam mill, on Main Street, and will put up the new building as soon as the foundation is ready.

ATLANTA, GA. — Tenement-house for Fulton County Cotton Mills, brick, two-st'y, 40' x 70'; cost, $6,500; J. Moser & Lind, architects.

Additions to residence of Mr. Marsh, consisting of wing, two-st'y, brick; cost, about $5,000.

Two-st'y brick half-timbered stable, 25' x 45', for Capt. Henry Jackson; cost, $3,000; J. Moser & Lind, architects.

ATTLEBORO', MASS.— Gideon Horton is to build a new block here.

BEVERLY, MASS. — A house is now building for Mr. Thos. E. Proctor, from plans of Messrs. Hartwell & Richardson, of Boston; Joseph H. Ober, builder.

BRIDGEPORT, CONN. — A large New Hampshire and Connecticut company has purchased a fine tract of land on the southwestern extremity bordering on Cedar Creek, and will, within six months, erect large iron-works on the same.

BRYN MAWR, PA. — Marshall Tevis, of Haverford College, has purchased the quarter-acre of ground adjoining his premises, and will shortly build upon it.

Workmen have begun the erection of a brick building for the Tradesmen's National Bank, of Conshohocken.

Several thousand perches of stone will be required for the new Catholic church of Villa Nova. William Hayden, of Bryn Mawr, has the contract for furnishing them.

PROPOSALS.

STEAM PROPELLER FOR THE QUARTERMASTER'S DEPARTMENT.
[At New York, N. Y.]

DEPOT QUARTERMASTER'S OFFICE,
CORNER HOUSTON AND GREENE STS.,
NEW YORK CITY, February 5, 1883.

Sealed proposals, in triplicate, with a copy of this advertisement attached to each, are invited, and will be received at this office **until 12 M., March 7, 1883**, at which time they will be opened in the presence of bidders, for the construction of a steam propeller for the United States Quartermaster's Department, for service at Fort Monroe, Virginia. Bids are invited to be made for the vessel complete; also for that portion embraced in specifications No. 1, or that in No. 2, or that in No. 3, only, or those portions in any two of them. Plans and specifications of the same, together with all other necessary information, will be furnished to bidders, on application to the Chief Quartermaster on Governor's Island, New York Harbor, the Depot Quartermasters at Washington, Baltimore, Philadelphia, and Boston, the Post Quartermaster at Fort Monroe, Virginia, and at this office. Bids are also invited for the work on the basis of supplying out-board condenser, 6-inch, No. 8 copper, or ½ brass. Also on the basis of the Government supplying the circulating and air pump, and a condenser of one-half the required capacity, the contractor furnishing the other half and making all connections. In either case, if award is made thereon, the specifications will be changed accordingly. The right is reserved, on the part of the United States, to reject any or all bids. Proposals should be indorsed "Proposals for Construction of Steam Propeller," and addressed to the undersigned. HENRY C. HODGES,
Deputy Quartermaster-General, United States Army.
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PROPOSALS.

INSTITUTE BUILDING.
[At Waterville, Me.]

WATERVILLE, ME., February 10, 1883.

The undersigned building committee will receive sealed proposals for a three-st'y brick building on the lot in Waterville known as the Waterville classical institute lot; the contractors are to furnish all labor and material; the proposals may be for the whole combined, or for the mason-work and carpenter-work separately; proposals will also be received for the amount the contractors will give for the brick building now on said lot, the same to be removed; the plans and specifications may be seen at the office of E. F. Webb, at Waterville, or at the office of Fassett & Stevens, architects, Portland, and proposals may be directed to the committee at Waterville, Me.; the committee reserve the right to reject any or all bids; proposals will be opened **on Saturday, March 10, 1883**, at the Elmwood Hotel in Waterville, at 11 o'clock, A. M.

EDMUND F. WEBB, MOSES GIDDINGS, JOSEPH RICKER. } Building Committee.
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SCHOOL-HOUSE.
[At Philadelphia, Pa.]

Sealed proposals, indorsed "Proposals for Building a Public School-House on the Northwest corner of Nineteenth and Reed Streets, in the Twenty-sixth Ward" will be received by the Committee on Property of the Board of Public Education, at the office of the Board, No. 713 Filbert Street, **on Saturday, March 3, 1883, at two o'clock**, P. M., for the erection of a public school-house on a lot of ground situate on the northwest corner of Nineteenth and Reed Streets in the Twenty-sixth Ward, at which time said proposals will be opened by the Committee on Property.

Said school-house to be built in accordance with the plans and specifications of L. H. Esler, Architect and Superintendent of School Buildings, to be seen at the office of the Board of Public Education.

No bids will be considered unless accompanied by a certificate from the City Solicitor that the provisions of an ordinance, approved May 25, 1860, have been complied with.

The Committee reserve the right to reject any or all bids not deemed satisfactory.

By order of the Committee on Property.
374 M. W. HALLIWELL, Secretary.

IRON-WORK.
[At Boston, Mass.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., February 8, 1883.

Sealed proposals will be received at this office **until 12 M., on the 28th day of February, 1883**, for furnishing and fixing in place complete in the post-office and sub-treasury extension-building at Boston, Mass., the iron-work of post-office screens, stairways, railings, floor-lights, in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the superintendent.
374 JAS. G. HILL, Supervising Architect.

MOVABLE DAM.
[At Louisville, Ky.]

U. S. ENGINEER OFFICE, 82 WEST THIRD ST.,
CINCINNATI, O., January 12, 1883.

Sealed proposals in duplicate will be received at this office, **until 12 o'clock, noon, on Thursday, the 1st day of March, 1883**, for the construction of the parts necessary for 200 feet of movable dam, and the delivery of the same at Louisville, Ky.

Approximate quantities: Wrought-iron, 28,000 pounds; cast-iron, 2,500 pounds; malleable-iron, 850 pounds; dressed white-pine, 1,260 feet, B. M.; dressed white-oak, 400 feet, B. M.

Specifications and all necessary information can be obtained by application to the undersigned.
374 WM. E. MERRILL, Major of Engineers.

DAM.
[At Louisville, Ky.]

U. S. ENGINEER OFFICE, 82 WEST THIRD ST.,
CINCINNATI, O., January 12, 1883.

Sealed proposals, in duplicate, will be received at this office **until 12 o'clock, noon, on Thursday, the 1st day of March, 1883**, for the construction of the parts necessary for 200 ft. of movable dam, and the delivery of the same at Louisville, Ky.

Approximate quantities: wrought-iron, 28,000 lbs.; cast-iron, 2,500 lbs.; malleable iron, 850 lbs.; dressed white-pine, 1,260 feet B. M.; dressed white-oak, 400 feet, B. M.

Specifications and all necessary information can be obtained by application to the undersigned.
374 WM. E. MERRILL, Maj. of Engineers.

COURT-HOUSE.
[At Caledonia, Minn.]

Sealed proposals will be received by the Building Committee of the County Commissioners of Houston County, Minnesota, **until March 21, 1883**, at the office of the Auditor in Caledonia, for the construction of a stone Court-House for said County, according to plans and specifications of same now on file at the Auditor's Office, and at the office of the architects, C. G. Maybury & Son, Winona, Minn., who will give any further information desired. No bids will be received except for the whole building complete as specified. The successful bidder will be required to give bonds in the sum of $5,000. The right to reject any and all bids is reserved. By order of Building Committee.
376 E. K. BOVERUD, County Auditor.

COAL-POCKET PIER.
[At Providence, R. I.]

SUPERINTENDENT'S OFFICE,
PROVIDENCE, R. I., February 15, 1883.

Bids will be received **until Thursday noon, March 1st, 1883**, for the building of a new coal-pocket pier in East Providence, with storage capacity of 10,000 tons, in addition to the one already contracted for. Plans and specifications can be seen at the office of John W. Ellis, Engineer, Woonsocket.

The company reserves the right to reject any and all bids. W. E. CHAMBERLAIN,
374 Superintendent.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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AS was suggested at the last Convention of the American Institute of Architects, invitations have been issued to all members of the Institute to submit competitive designs for the amusement and instruction of the participants in the next Convention, to be held in Rhode Island this year. The programme presented is a simple one, but has a special interest from the fact that some one of the designs may at some future time be actually carried into execution. It seems that a beginning has been made toward raising a fund for securing permanent accommodations in New York for the uses of the Institute, and the subject of competition is, very appropriately, the future Institute building. The structure is supposed to stand on an ordinary New York double lot, fifty feet front by one hundred feet deep, on the northeast corner of two streets, giving it a south and west aspect, and the plan is to include, as would probably be necessary, offices and stores for renting, to lighten the burden of interest upon the Institute, which would find sufficient space, at least for its present modest needs, upon one or two floors. The conditions are such as every architect will understand, and it seems altogether likely that a large number of designs will be offered. There is an attraction to the ambitious professional man in the idea of competing with his fellows for the favor of judges whose verdict he can respect, which will, we think, induce many of the ablest architects in the country to set aside some hours out of their overworked lives, to indulge once more in the pleasure of artistic toil pursued for its own sake, and for the sake of the intelligent sympathy that comes to them so rarely. The original suggestion of the competition was made with the idea that the interest excited by a competition of pure design, unhampered by the conditions of ordinary practice, might lead to the development of some characteristic features, which would afford a dim glimpse of that vision of the future, the American style. We cannot say that we have much hope of this, our own fancy being that the American style, when it comes, may be the outgrowth of those gigantic buildings now demanded in our crowded cities, for which neither the old forms nor the old modes of construction suffice, rather than a development of the commonplace architecture of ordinary use, but, however that may be, the work of first-rate architects intent upon winning the applause of their professional brethren is sure to be the very best that the country can at present produce.

THE bankruptcy of the contractors for the London Courts of Justice has some interesting points. According to the report in the *Builder*, their misfortune seems to have been mainly caused by disputes in regard to extras, of a kind familiar to architects who have had experience in important work, but none the less instructive as showing the peril to a contractor of leaving such matters to be adjusted in some random manner, months after the architect and owner have forgotten all about them. The statement made to the creditors shows that the interpretation of the contract for the Law Courts practically determines the whole financial condition of the firm, a claim being still unsettled for extras amounting to one hundred and twenty thousand pounds, which would, if allowed, not only suffice to pay the debts, but to leave the contractors a handsome surplus. As the creditors are naturally interested in this claim, an account of the manner in which it accrued was given them, from which it appears that the original tender was a little less than seven hundred and twenty thousand pounds, but the contract price was reduced before signing, by striking out some of the items included in the original bills of quantities, to about seven hundred thousand. In the course of the work some of the items so struck out were re-introduced, by order, and were of course charged for as extras, while many other variations from the contract were made, some of them affecting the largest items in the estimates. As an instance, it was mentioned that the original tender was made with a provision for notching or "joggling" the stones of the masonry, but before signing the contract the representatives of the Government struck out this, in order to save the expense.

WHEN the work came to be built, however, the architect, Mr. Street, demanded that the stones should be joggled, and on the explanation of the contractors that their agreement did not require it he sent his man to them to say that work built without joggling would be thrown down with crowbars by his direction. The contractors then took measures to cut joggles in the stones, and expended in this way seventeen thousand pounds—nearly eighty-five thousand dollars, expecting, of course, to be paid for work which was expressly stricken out of the original estimate; but on making their claim they were told that no written order had been given for the change, and that the claim would not be allowed. A second instance of costly changes, made at the request of the architect, was found in the case of the roofs of the courts. In the contract drawings a single design was given for all the roofs, but when the work came to be done, Mr. Street insisted that the roof of each court should be of different design, and the contractors were put to a large additional expense in procuring new patterns and altering their mode of work, for which no compensation whatever was allowed them. A third claim, amounting to about ten thousand pounds, was for rubbing the interior stone-work twice. Mr. Street, the contractors say, ordered the rubbing to be done at an early stage in the operations, although representations were made to him that the work would be thrown away; and the result was that the whole had to be done over again subsequently. In regard to the work which they agreed to do, the contractors show that their calculations were accurately made, and, as it proved, the actual cost of the work specified had not in a single instance exceeded their estimate; but on account of the "thousands of alterations" which had been made they were obliged to spend a third more money than would have been needed to complete their contract. Of this extra outlay, which with interest and a reasonable profit would amount to one hundred and eighty-six thousand pounds, or nearly a million dollars, Mr. Street, they asserted, had refused to certify more than ten thousand pounds, although most of it was incurred through his order or request; and they had no resource but to make a direct claim from the Government. If their contract, like most, provides that no order for extra work shall be valid unless given in writing, it is safe to say that they will lose their case, and they and their creditors must submit to the consequences of their incautious conduct, unless the Government should see fit to relieve them out of pure benevolence.

THE Commissioners appointed to consider the question of granting permission for building an underground railroad beneath Broadway have made a report, unanimously recommending that the permission should not be given. In the clear and sensible summing-up of the facts which the report contains, it is shown that the cost of constructing the road, which would involve the excavation and removal of a prism of earth and rock forty-two feet wide, twenty-seven feet deep, and ninety-five hundred feet long, through the very middle of the traffic of the busiest street in the world, besides the other and far greater work of shifting sewers, gas and water-pipes, building the double tunnel, and supporting or underpinning the buildings along the route, would be so enormous that the privilege of beginning operations should certainly be withheld from any association which could not prove its ability to carry them through to the end, as well as to provide for equitable compensation in case of unavoidable injury to private interests. The association which petitioned for the concession, however, so far from ap-

pearing well prepared to meet all these requirements, could only show subscriptions for about twenty thousand dollars of its stock, and of this but a very small portion had been actually paid in. Besides this, there was no attempt to prove that the proposed road, even if built, would connect with other roads at either end of its route; and the Commissioners very properly say, in view of all the circumstances, that "it clearly appears" that "the present capital and credit of the petitioner, and the financial status of its present officers, directors and shareholders are not sufficient to carry on or complete the proposed railroad;" and "that the railroad, if completed, and not operated in conjunction with other similar roads, forming a completed system, would be of no practical value or utility." We venture to say that every one who has read the testimony presented to the Commissioners will entirely agree with their sober and business-like judgment, and if, as is probable, their recommendations shall be followed by the Supreme Court, the people of New York may be congratulated upon their escape from an attempt to abuse their confidence and patience for the sake of enriching a few speculators.

WE publish in another column a letter from a well-known New York architect, describing his adventures in a personal test of the facilities for escaping from fires in lofty buildings, to which we would call the special attention of our readers. Underneath our correspondent's lively narrative there is a serious moral, and one cannot help wishing that it might be the lot of other architects, once in their lives, to see danger as near to them, and escape it as unharmed as he. We know the pressure which is often brought to bear upon architects to build with as much regard to show and as little to safety as possible, but the most complaisant servant of speculators, if he could be brought to meet death face to face in a blazing hotel or factory, would find himself thenceforth armed with new firmness in insisting upon those safeguards which he could easily devise if he wished. One suggestion in Mr. Bloor's letter, in regard to the advantage which the insurance companies might derive from a more efficient surveillance of the small district in New York in which so vast an amount of property is concentrated, deserves serious attention. For ourselves, we may say that nothing strikes us more forcibly, on many occasions, than the strange indifference of underwriters to circumstances which often increase ten-fold the risk in the buildings which they insure, without the slightest advantage to any one. For example, we had occasion not long ago to examine the cellar of a store on a principal street, full of valuable property to the very roof, and observed that the pipes from the furnace, including, if we remember rightly, the smoke-pipe, were wrapped with paper of all kinds, in several layers, tied on with strings. It was warm weather, and the furnace was no longer in use, but on making inquiry we were told that the papers had been on all winter. The cellar was roughly plastered, but the ends of the furring strips on the walls were visible, and the spaces between them were open. Lighting a match, and holding it near one of these openings, the flame was drawn out by the strong upward draft, showing that any fire originating in the basement would have run immediately to the roof. The building had but one narrow wooden staircase, so that in case of a conflagration the occupants of the upper stories would have had small chance for their lives, but, independent of peril to individuals, here was many thousand dollars worth of property, for which various underwriters had made themselves responsible, kept for months in imminent danger of destruction by a piece of carelessness which a two-minute visit of an insurance patrol would have remedied.

THE mild despotism which rules the building affairs of New York has fallen into a little ridicule the past week, on account of a certain oversight of one of its inspectors. It seems that the lawfully authorized official reported a lack of means for escape from fire in the House of Detention on Mulberry Street, and the Bureau forthwith issued orders that balconies and iron ladders should be provided on the exterior. The Police Commissioners obeyed the mandate, and the fire-escapes were erected. After a considerable time some unusually intelligent person noticed that all the windows opening on the new fire-escapes were heavily barred with iron, so that no one could possibly get out of them, no matter how hot the fire might be behind him. It certainly seems cruel to provide prisoners with fire-escapes which they can only look at through an immovable grating, and the obvious remedy would be to cut away the bars; but in this case all the prisoners would decamp at the first opportunity, and the Police Commissioners are left in the singular situation of being obliged either to allow their captives, mostly innocent witnesses, to run the risk of being burned alive, or to provide them with means of escape available whether there is any fire or not.

THE Building Bureau, notwithstanding the prominent position which it now occupies in the minds of the people of New York, is managed with extreme economy, the total appropriation for its maintenance last year having been but thirty-six thousand dollars. The work of the Bureau is done without requiring any fees from those having transactions with it, and there is nothing but the appropriation to pay the salaries of the men who control the vast building operations of New York. At present thirty-three persons constitute the whole force of the Bureau, these being required not only to examine and pass upon the plans and specifications of every building constructed or altered within the city limits, but to inspect from time to time the manner in which those plans are carried into execution, and besides all this, to examine all the old buildings about which they, or any one else, has reason to think that there is anything objectionable. By working over hours, ten men, including the chief inspector, are able to keep up with the business of the office, and twenty examiners, at a salary of nine hundred dollars a year, have to divide among them the supervision of the work on at least four thousand buildings, old and new, every year. The slightest reflection will show that it is quite impossible for one man to keep anything like an efficient watch of two hundred buildings a year, and it is much to the credit of the Bureau that it has accomplished so much; but its usefulness can never be so extensive as it should, until money enough is granted it to provide for adequate service.

THE report of the Boston Park Commissioners for the past year contains an instructive commentary on the ultimate pecuniary value of public parks to a community which has the nerve to make the preliminary sacrifice needed to secure them. In 1877, the district in that city known as the Back Bay, then about half built over with first-class dwelling-houses, had fallen into disrepute, on account of the annoyance arising from a foul tidal basin which bordered its western and more remote portion. The immediate surroundings of Boston are not too savory, to say the least, but the new region enclosed between the basin and the river, both of which received large amounts of sewage, had become particularly offensive, and a sort of panic seized the owners of the property, many of whom sold their lands and houses at a loss and moved away. To save the large interests of the section, it was then decided to fill the noisome basin, and convert most of its site into a park, bordering the natural stream of fresh water which flowed through it, and which it was necessary to provide with some access to the river; and in accordance with the wholesome Massachusetts law, a large part of the estimated cost was assessed, under the name of "betterment," upon the property which was thought likely to be benefited by the improvement, this including all the estates within half a mile or so of the park. As a rule, these assessments were cheerfully borne, the owners of the estates perceiving that they gained much more than they paid for. Beyond the resources so obtained, the increase in the taxable value of the whole territory was looked to for reimbursing the cost of the improvement. The prudence of these calculations has already been shown, although the park is yet incomplete. As soon as the decision was made to reclaim the basin, a general advance in prices of real estate took place all over the Back Bay territory, together with a renewal of activity in building operations, which have together increased the taxable valuation to such a degree that the revenue from the district was nearly a quarter of a million dollars greater in 1882 than in 1877. The total gain in taxes and betterments has amounted in five years to more than one million dollars, while the whole cost of the park, including the purchase money for the land, and all the expenses for filling and improvement, has amounted thus far to but eleven hundred thousand. It is obvious that as the receipts for taxes will continue to increase, while the expenditure on the Park will soon cease, the balance will before long be in favor of the enterprise, which, instead of a costly luxury, will be found before many years, not only to have cost the tax-payers nothing, but to be as much a source of profit as a public gold-mine would be.

BUILDING SUPERINTENDENCE. — XXVII.

THE trusses over the auditorium and gallery require to be submitted to similar processes, which it is unnecessary to describe at length. The former, however, as shown in Figure 183, not being tied at the foot of the rafters, exerts a thrust upon the walls at each side, which would certainly overturn them if not counteracted, and in order to be able to provide the necessary resistance we must know the direction and amount of the thrust. A glance at the diagram shows that the truss really consists of three portions, the upper part, *A E F*, forming a rigid frame, resting upon two other frames, *E K M I B*, and *B F L N J*, the latter of which are inclined inward from the wall, and tend to push it outward at their foot, and, disregarding the various pieces composing these inclined frames, which serve principally as braces against deformation by wind-pressure, we may consider each as equivalent to a single straight timber, or inclined column, acting as shown by the dotted lines *E M* and *F N*. It is easy to ascertain the thrust at the foot of this column, by laying off *A B* in Figure 184, equal, by any required scale, to the vertical pressure on *E*, that is, to half the weight on the truss *E A F;* then drawing *A C* on the diagram, parallel to *E M*, and *B C* horizontally intersecting *A C* at *C*, *B C* will then show by the scale the horizontal outward thrust on the wall at the point *M*, in Fig. 183. This being ascertained we must now find the shape and size of buttress, if any, which is necessary to keep the walls from being pushed over by the thrust. We can best do this graphically, as follows: —

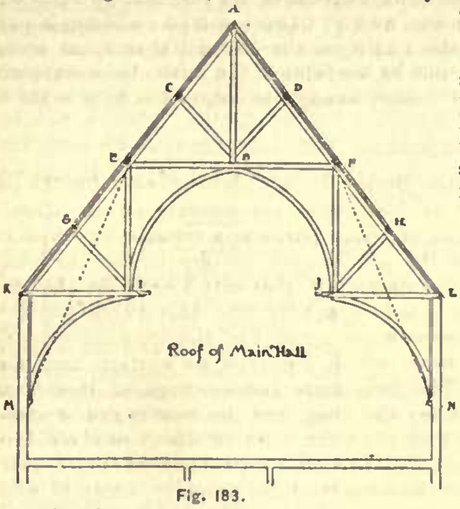


Fig. 183.

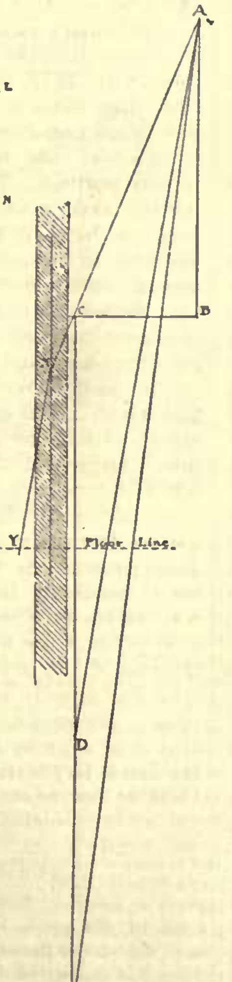


Fig. 184.

Beside the diagram for thrust in Figure 184, draw a section of the wall. The scale of this section, which is in a certain number of feet to an inch, has nothing to do with that of the stress-diagram, which is in pounds to an inch, and any scale may be used. Fix the position of the section so that, by its scale, the point *C*, which represents the place of application of the inclined force of the lower part of the truss, supposed to rest upon a corbel projecting from the wall, will come at the proper distance from the wall-surface, and draw a line at *Y*, representing at the same scale the floor-line, which, if the wall is anchored to the timbers of the floor, would be the point about which it would revolve in overturning. Next find the weight of a portion of wall extending from the floor-line up to *K* in Figure 183, and equal in width to the space between the windows, which we suppose to be five feet. Add to this the actual weight of the portion of the roof supported by *K E*, Figure 183, not including any allowance for snow or wind. The sum will give the vertical pressure which combines with the oblique pressure *E M* to change its direction in its passage through the wall. Laying off now this vertical pressure downward from *C*, in the diagram of Figure 184, to the same scale of pounds as the other pressures, we find that it extends to *D*. Draw now *A D*, which will give the direction and amount of the total combined pressures at the floor-line, and *X Y*, drawn parallel to *A D* from *X*, the point where *A C* prolonged strikes the plane of the centre of gravity of the wall, will give at *Y* the actual position of the intersection of this modified pressure-line with the base-line of the movable portion of the wall. The point *Y* falls outside of the wall, showing that its unassisted stability is not equal to the oblique pressure upon it, and that it will be overturned.

There are three ways of adding to the wall the requisite support. The most obvious of these is the addition of exterior buttresses, the weight of which will serve to deflect the pressure-line more directly downward, at the same time that their position will improve the stability of the wall by removing the point about which the pier must revolve, in order to overturn, beyond the intersection of the pressure-line with the base. The second resource is the construction of interior buttresses, the weight of which will also serve to deflect the pressure-line to a direction more nearly vertical, at the same time removing the point *C*, in Figure 184, horizontally away from the wall, until the point *Y* is brought within the base. The third method consists in piling up masonry in the form of pinnacles above the wall at the proper places, increasing by their weight the vertical component of the total pressure, until the line falls within the base of the wall, with little or no help from buttresses, either exterior or interior. This would be not only a perfectly legitimate and safe construction, but perhaps the most economical of any, since the weight of all the masonry extraneous to the wall itself would be applied in increasing the stability of the pier, while buttresses, either interior or exterior, must be continued to the ground, although the portion below the floor-line, much the largest part of the whole, serves in this case only as a support, without adding anything to the stability of the wall above the floor-line. There would probably be, however, some objection on the part of the building committee to such an unusual construction, and as we have ourselves some fear that masses of snow sliding down the roof might push the pinnacles off, with disastrous results, we will abandon the idea of employing this method. Of the two others, that of inside buttressing seems the less adapted to the circumstances, as the projection of the buttresses would obstruct the side aisles of the hall. If the room were planned with high walls and flat ceiling, the acoustic advantage of these projections would be sufficiently important to outweigh the objection to them as obstructions, but in the present case the shape of the roof, the echoes from which would be broken up and dissipated by the net-work of trusses, and the regular succession of braces springing from the corbels, which would intercept the waves of sound conducted along, as well as reflected from the walls, give all the security against unpleasant reverberation which could be obtained by interior projections, and it will be best on other accounts to avoid them by placing the buttresses on the outside.

We will first make trial of a buttress of the shape and size shown in elevation in Figure 185, and in plan in Figure 186. Finding first the weight of the buttress from the floor-line to the top, we add this to the weight of the wall as a part of the vertical force in Figure 184, where it is represented by *D E*, *C D* representing the weight of the wall exclusive of the buttress. The whole vertical force will therefore now be *C E*, and *A C*, the oblique thrust of the truss, remaining the same, the new resultant force will be represented, in direction and amount, by *A E*. If then, we draw a line, parallel to this new resultant, from the point where the line of thrust intersects the plane of the centre of gravity of the pier and buttress combined, to the floor, or base line, we shall at once see whether the whole will be stable.

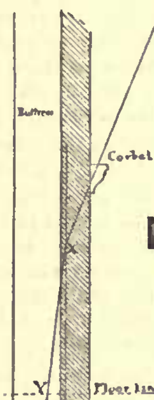


Fig. 185.

Fig. 186.

The first step in this process is to find the position of the centre of gravity of the pier and buttress. In the plan of the pier with its buttress, Figure 187, find the centre of figure of each portion separately, by drawing the diagonals of the parallelogram formed by each. Join these centres by the line *A B*. The centre of gravity of the whole figure will then lie on the line *A B*, at a point which must divide *A B* into portions inversely proportional to the areas of the parallelograms in which its ends respectively lie. The area of the parallelogram representing the wall is $5 \times 1\frac{1}{3} = 6\frac{2}{3}$ square feet; that of the parallelogram representing the buttress is $2 \times 1\frac{2}{3} = 3\frac{1}{3}$ square feet. Three and one-third is just one-half of six and two-thirds, so that the point *C*, which divides the line *A B* at one-third of its length from *E*, will show the centre of gravity of the complete figure, and if the pier and the buttress are of the same material, and carried to the same height, it will lie in the line of the centre of gravity of the whole mass. For our purposes we can assume that this is the case, and that *C* lies in the plane of the actual centre of gravity. We then find the corresponding point in Figure 185 by transferring its distance from the inside of the wall with the divider

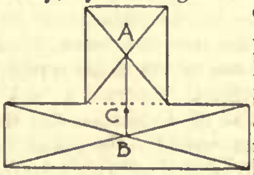


Fig. 187.

and draw a vertical line through it as shown. The line of the thrust of the roof, prolonged downward from the corbel, will intersect this new line of the centre of gravity at X, and $X\ Y$, drawn from X parallel to $A\ E$ in Figure 184, will show the line of the resultant pressure due to the influence upon the thrust of the weight of the pier and buttress. This line will strike the floor, or base-line of the movable portion of the wall, at Y, and as this point fulfils the condition of being nearer to the vertical line drawn through the centre of gravity than it is to the exterior of the mass, the pier and buttress, if well anchored at the floor-line, will safely resist the effort of the thrust of the roof to overturn them.

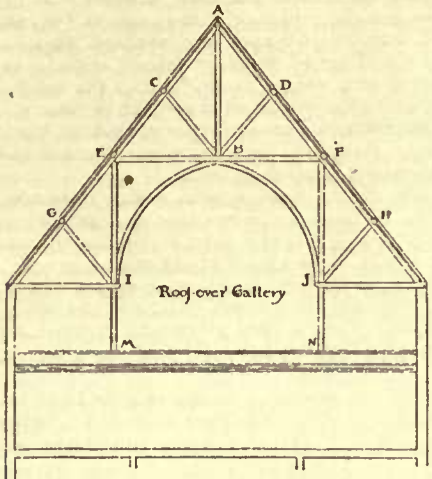


Fig. 188.

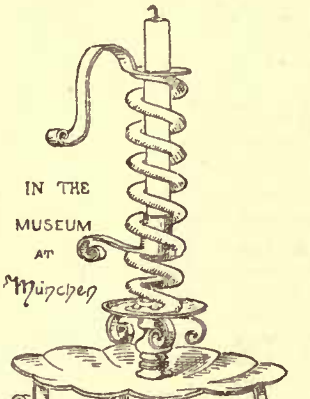
The roof over the gallery, as we see in Figure 188, being supported by posts at M and N, with suitable braced girders running back from $E\ I$ and $F\ J$, to carry the truss intermediate between the one shown in the figure and the end wall, resolves itself simply into the case of that over the stage, which we have already investigated; the curved braces $B\ I$ and $B\ J$ being added merely for ornament and to correspond with the main roof. We have now only to calculate the necessary size for the purlins, which are virtually beams 12 feet in length, having a clear span equal to this distance less 6 inches, the width of the principal rafter, and subjected to a distributed transverse stress, due to their own weight, the weight of the portion of roof which rests upon them, with an occasional wind-pressure added of 44 pounds to the square foot; and the sizes of the common rafters, which are also inclined beams, of a length equal to the distance between the purlins, and subjected to a distributed transverse stress, due to their own weight, with the weight and wind-pressure upon the portion of roof which each carries. The purlins should be nearly square in section, and each supports the strain of a portion of roof $11\frac{1}{2}$ feet long, and of a width equal to the distance between its centre and the centre of the next one, which in this case is 15 feet. We have previously estimated the vertical load, including weight of snow, on each square foot of the roof-surface to be 30 pounds, which would here be equivalent to a pressure, normal to the plane of the roof, of 19 pounds. To this must be added the maximum wind-pressure, which we found to be 44 pounds, making 63 pounds per square foot as the total transverse pressure. The purlin sustains $15 \times 11\frac{1}{2} = 172\frac{1}{2}$ square feet, so that the stress upon it will be $172\frac{1}{2} \times 63 = 10868$ pounds. Its own weight will be, at the utmost, 500 pounds, and over the auditorium the underside of the common rafters will be lathed and plastered, adding a weight of about 10 pounds per square foot, or 1725 pounds upon the whole space sustained by each purlin. This, as well as the weight of the purlin itself, being a vertical pressure, of which a portion is transmitted down the rafters, while only the component normal to the roof-plane exerts a stress upon the purlin, we can find the normal pressure corresponding to the vertical weight of 2225 pounds, either graphically or by applying the proportion of 30:19, which we have just ascertained to represent the same relation in the case of the weight of roofing and snow. This would give $30:19 = 2225:1409$. Adding this to the others, we obtain $10868 + 1409 = 12277$ pounds as the measure of the distributed transverse stress upon the purlin. This is a severe stress for a timber $11\frac{1}{2}$ feet long, and we shall do well to employ Southern pine for the purlins, instead of spruce, on account of its superior stiffness. Using the formula before employed in calculating the tie-beam, $\frac{b\,d^2\,C}{sL} = W$, we shall have here:

$W = 12277$
$S = 6$
$L = 11\frac{1}{2}$
$C = 550$, the constant for Southern pine, as 450 is for spruce.
b and d are both unknown.

Instead of transposing the formula, it is often less trouble to assume certain dimensions, and try whether they fulfil the required conditions of strength. In this case we will try whether a 10″ x 10″ stick will do. Substituting these dimensions for b and d in the formula, and remembering that the weight, 12277 pounds, being distributed uniformly along the purlin, exerts only half as much breaking stress as if it were concentrated at the centre, we shall have $\frac{10 \times 10^2 \times 550 \times 2}{6 \times 11\frac{1}{2}} = 15942$ pounds, as the distributed weight which will be safely borne by the timber. This is greater than we need, and we will try an 8″ x 10″, which we find to be capable of supporting safely 12754 pounds, or a little more than the given weight, so we adopt these dimensions.

The rafters are last to be considered. The steady stress upon each of these, consisting of the vertical pressure of the portion of the roof with its weight of snow resting on it, acts vertically, and the inclination of the rafter being oblique to this vertical force, it is necessary to resolve the single stress due to the weight into two, one of which will act in a direction normal to the inclination of the rafter, forming a transverse strain of the ordinary kind, while the other acts along the rafter by compression, and is to be resisted by the rafter acting as a column. The clear span of each rafter, from purlin to purlin, is 15 feet, less 8 inches, the width of the purlin, and as the rafters are spaced 16 inches from centres, each carries a portion of the roof $14\frac{1}{3} \times 1\frac{1}{3}$ feet in area. The weight upon this, including that of the rafter itself, the roofing boards and slates, the lath and plaster underneath, and a possible load of snow, will be $14\frac{1}{3} \times 1\frac{1}{3} \times 40 = 764$ pounds. Drawing a vertical line representing this weight, at any scale, we make it one side of a triangle, of which the other two sides are drawn respectively parallel to the direction of the rafter, and at right angles to it. The length of these two sides, measured at the same scale, will give the components of the vertical pressure, which act along the rafter and transversely to it. We shall find the transverse component to be about 455 pounds, and the other, acting to compress the rafter, about 600 pounds. At 400 pounds per square inch, the sectional area of the rafter, acting as a column, required to resist this stress would be $1\frac{1}{2}$ square inches, and the dimensions needed to resist the transverse strain must be added to this. The transverse component of the simple weight of roof and snow we have just seen to be 600 pounds. To this must be added the wind-pressure, which is a direct transverse strain, amounting, by our previous estimate, to 44 pounds per square foot, or $14\frac{1}{3} \times 1\frac{1}{3} \times 44 = 841$ pounds on the whole area supported by each single rafter. Adding the two results together, we have $600 + 841 = 1441$ pounds as the distributed transverse pressure on the rafter. By the formula previously employed, assuming the rafters to be of spruce, with a value for C of 450, we find that 3″ x 7″ timbers will give a resistance of 1540 pounds; and suppose $1\frac{1}{2}$ square inches of the sectional area, comprising a slice $\frac{1}{4}$″ wide by the depth of the rafter, to be occupied in resisting the longitudinal stress, we shall have remaining a piece $2\frac{3}{4}$″ × 7″, whose strength, according to the formula, will be $\frac{2\cdot 5 \times 7^2 \times 450 \times 2}{14\frac{1}{3} \times 6} = 1436$ pounds. This is smaller than we need, but the difference is so very slight that we need not regard it, and we adopt this as the proper scantling.

BUILDERS' SCAFFOLDING. — IX.



SKELETON structures are of little avail to encounter forces without being stiffened by means of bracing, and hence bracing forms an important part of their design and construction. The bracing of scaffolding and of staging structures, like that of all skeleton structures, is of vital importance to their stability, and in most cases of complexity requires considerable skill in its devising. The essential principles which govern the design of skilful bracing of skeleton structures, such as composed of a system of separate standards, columns, etc., braced or latticed together, forming a symmetrical compact framework, being those which apply to all braced skeleton structures, will be those which we shall consider under simple conditions of application in a braced pier or trestle. Motives of economy, higher efficiency, convenience of detail, special adaptability to its purpose, magnitude of the structure, its position, whether vertical, horizontal or oblique; the manner in which the structure is loaded, the direction of its encountering external forces, and the nature of those forces, have each and all their special modifying influences on the *kind*, intensity, and direction of strains, which will occur at certain points under each or any combination of such conditions. Thus in bridge-trusses, a loaded floor must be supported at certain points, imposing a transverse load to be distributed along the chords. It is sometimes convenient as well as economical to divide the panels into half-panels when the span is large, so as to supply these points close enough together along the chords for the proper intervals of support, while at the same time adopting a convenient, efficient bracing angle, so that in such half-panel arrangement every oblique brace will pass or intersect an intermediate vertical web-member at the middle point of its height, the intermediate vertical web-member marking the half-panel points. On the other hand, in skeleton pier structures, in which the load is supported directly by columns or standards, the bracing, both horizontal and diagonal, is designed for the purpose of stiffening the structure against the distorting influences of horizontal forces, and at the same time of effecting economy of materials and labor; because without such bracing, the sectional area of the columns would require to be enormously enlarged in proportion to increase of height, so that in very high structures it would be practically impossible either to construct them of cast-iron, or afterwards

erect them. The false-works, staging, and constructive appliances would also have to be of such increased strength and power as to make such a system of ponderous construction commercially prohibitive. Resort must therefore be had to devices which shal }economize materials, and remove the other objections alluded to, by affording an economical means of rigidly connecting the columns together, so as to render them practically one whole compact, independent structure, by preserving their mutual relation and position unaltered, so as to afford continuous mutual support to each other through the medium of a solid web connection, or at uniform intervals by latticing or bracing, which shall occupy systematic lines traversed by the strains as they are distributed throughout the structure, passing from column to column as actuated by external forces. We here take the illustration of an isolated skeleton pier to explain the operations of bracing, because of its integrity admitting of a more distinct view of the subject than would a section of scaffolding, especially as the Scotch crane standards of the composite description, and the French *sapine* already described in these papers, are of this type of structure.

For the systematic consideration of the purpose and action of bracing, we must first review the nature and extent of the forces which in scaffolding and staging are intended to be counteracted in practice. These are primarily divisible into external and internal forces. The external forces will naturally be divided into the insistent, permanent or dead loads, the weight of superstructure and substructure, and of the moving or temporary loads.

As we have already given some data in connection with *ledger* scaffolding, we shall here commence with the permanent loads for *framed* scaffolding,[1] consisting (1) of the weight of the structure, viz.: standards, braces, runners, horizontal ties, lookouts, etc., which may (with iron-dogs, spikes, etc.,) be estimated in round numbers, at 30 pounds per cubic foot for white-pine. Traverse rails, 10 to 12 pounds per foot lineal. (If rack-rail is attached for toothed wheel-driver to gear in for traversing motions, allow an additional 10 pounds per foot lineal.) (2) The weight of the moving load, which will consist of hoisting crane and materials.

The weights of English types (wood frame) of overhead travelling-crabs, by hand-rope or crank-power, for three sizes, are as follows, for 35-foot spans: —

2 ton size 3 tons, 0 cwts.
4 " 3 " 12 "
6 " 4 " 13 "

(The spans run from 16 to 35 feet.)

The hoisting-chain will consist of 50 feet, or more, according to height and purchase used, of chain of the following weights, per fathom of 6 feet.

[illegible]" diameter of rod at 8 pounds weight, its working load is 1. ton.
[illegible]" " " 12 " " " " 1.7 "
[illegible]" " " 22 " " " " 2.2 "
[illegible]" " " 32 " " " " 4. "
[illegible]" " " 43 " " " " 5.5 "
1" " " 56 " " " " 7. "

For other spans the decreased weight of frame alone (less weight of crab, travelling-frame and iron end-carriages) will be as cube of span.

The *crabs* weigh separately, for the above sizes, as follows: —

2 ton size, 2 cwt. 0 qrs. 14 lbs., single purchase, cwt. qr. lbs.
4 " 3 " 0 " 0 " " 3 " 1 " 12 double do.
6 " 4 " 3 " 15 " " 5 " 1 " 22 " "

The weight of end-carriages and travelling-frames, separately, are not at present known to the writer.

The weights of steam overhead travelling-cranes, with boilers, etc., complete, are as follows (information furnished by kindness of Tannett, Walker & Co., Leeds, England.): —

Size.	Span in feet.	Total weight of Traveller.	Weight of one End-Carriage.	Weight of Steam Crab, Boiler, etc.
5-Ton.	23′ 7½″	11 Tons.	10 cwt.	2½ tons.
10 "	38′ 1″	16 "	16½ "	4½ "
15 "	40′ 0″	21½ "	26 "	4½ "
20 "	32′ 6″	15 "	28 "	4½ "
20 "	42′ 1½″	20 "	28 "	4½ "
30 "	43′ 6″	23 "	30 "	5 "
50 "	37′ 6″	50 "	30 "	11 "

The weight of hoisting-chain, block, hook, etc., are included in above.

As block tackle will be used with these cranes and also with the larger sizes of the hand-power cranes to increase the *purchase*, the chains above specified will be strong enough for higher powers, according to the number of sheaves in the lower or moving block, which will accordingly reduce the strain on the hoisting-chains. The theoretical gain of power (for the mere equilibrium of the *power* and *weight*) and consequent loss of velocity is equal to twice the number of sheaves in the moving block; but the practical gain is less, owing to friction. Therefore, if one sheave is used in the moving block, the strain on the chain tackle is only one-half (theoretically) of the direct strain of weight raised, without the intervention of a moving block. If two sheaves are in the moving block the tackle is strained theoretically only one-fourth of the direct strain; but the length of chain required is doubled in the first case, and quadrupled in the second case. It is thus preferred to increase the lifting power of small chains than to employ larger chains than one-inch diameter of rod, because of the sudden, violent jerks to which it is liable, as iron of larger diameter is less fibrous and more liable to be of rather crystalline structure.

In Scotland and parts of England, brick, rubble and mortar are hoisted to the masons' scaffold in a box, containing three hundred bricks, weighing, with suspension-chains, about 2,500 to 2,600 lbs.

If any part of the masons' scaffold is made to rest upon the cross-timbers of the frame scaffold, its weight and that of its loading of materials, etc., and the oscillatory influences which it may occasion to the frame scaffold, must be added. As the maximum weight of materials hoisted by the crane at any one time, together with the gross weight of crane in working order, with coal, etc., in the case of steam power, may all come together upon any standard, the maximum estimated load for scantlings of standards should include sufficient allowance for this moving weight, at double its static weight.

For staging and false-works the weight of floor and of floor system of girders, joists, planking, etc., an allowance should be made of ten to twenty pounds per superficial foot, according to spans and scantlings, of girders, thickness of planking, etc.

Different length trusses of the same special design have total loads in simple proportion to the load per foot run, of dead, live, or temporary loads, and in proportion to the cube of the span; while the strength of such trusses is as the square of the span.

The weight of iron-work, as girders, etc., forming a part of such structures, will depend on special features and details of the design, and hence no approximation can be here given, and therefore the weights of all such must be estimated from the individual parts in each case for itself.

Shelter-sheds or huts over crabs may be estimated from 1,000 lbs. to 4,000 lbs. weight, i. e., five or six pounds per square foot of entire surface of walls, roof, floor, etc. (of wood), for boards and light frame joists, etc.

In order that bracing may not be rendered inoperative in preserving the stability of the structure, the columns or standards must have secure foundations. When they are of temporary construction, and other than hard ground, gravel, sand, rock, or other solid foundation, such as timbers, girders, joists, arches, flags, lintels, soft or *made* ground, drains, sewers, vaults, special devices suitable to the case must be adopted to render the foundation secure against rupture, settlement, or other movement.

In staging, the distribution of weight of floor system, and equally distributed symmetrical load over a regular *square* system of columns is, on the *inside* columns, equal to the square space enclosed by four contiguous columns, or the square of the span between columns, if the columns be all equidistant; if not equidistant, it will be the rectangle of their respective distances in directions perpendicular to each other. On the *outside* columns the load will equal half of the square or rectangle; on the *corner* columns the load will be one-quarter of the contiguous square or rectangle.

For live, moving and temporary loads allow the greatest amount that can come on one standard, and that which might be collected together on the square of the length of a whole span, and its maximum strain will depend on the nature of the loads and on the extent of probable aggregation of the materials in maximum quantities. This must be treated as an unsymmetrical loading, the moments of the forces for which will be discussed farther on.

Next consider the action of wind-pressure on the various surfaces exposed to it, of the structure, superstructure, derricks, cranes, hoardings, awnings or enclosing surface surrounding a building in course of erection, and its scaffolding, such as alluded to in the October number.[2]

The manner of transmitting this surface pressure to the standards undiminished — in the case of staging it is delivered through the floor system to the top of the standards, and evidently in the case of a skeleton-pier — throws part of the weight on the leeward standards or columns, causing bending moments on all of their sections and consequently relieving the windward standards by this displacement of the forces.

The data for the mechanical action of wind on structures is not so satisfactory or precise as to be reliable to any degree of exactness.[3] However, Tredgold's estimated allowance for roofs of 40 pounds per superficial foot, with a factor of safety of 3 or 4, according to the nature of the exposure, might be ample for our purpose, though engineers in this country usually adopt 50 pounds pressure, as maximum wind-force on exposed structures, per superficial foot in a vertical plane, normal to the direction of the wind. The British Board of Trade requires an allowance of 56 pounds per square foot of all exposed engineering structures, with a factor of safety of four. Engineers of Continental Europe allow 55 pounds per superficial foot, perpendicular to the direction of wind, with the same factor of safety. Of course all leverage produced by parts of structures projecting beyond their supports or *fixed* portions, which multiplies the natural intensity of the wind must be duly allowed for. The vertical component of the action of wind-force upon an object standing on a platform produced by the leverage of its centre of pressure above

[1] Illustrated by Figure 15, in November number, page 217.

[2] A notable instance of the temporary covering-in with boarding, glass, etc., of the prospective building with its entire scaffolding, was described in the *Building News* of February 16, 1877, in the case of the Crédit Lyonnais Building, Paris.

[3] The present development of the fonctions of the United States Signal Service is very commendable, but until it has adopted the proper means designed for the satisfactory solution of problems of maximum wind-force on land structures, against plane and curved surfaces, and to what extent isolated concentrations of force take place, etc., its usefulness is curtailed in an important direction.

the platform, must not be overlooked in estimating the maximum transverse strains on horizontal members of the floor system of staging, false-works, etc. There is also another vertical element in oblique wind-force which must be duly allowed for, especially for large platforms or floors of staging. There is a prevailing direction for high winds in most localities, and this should be ascertained for any place for which estimates are to be made, and inquiry should be made as to the liability to oblique winds, either downward or upward, in consequence of peculiarities of local surface-contours, and a proper compensation allowed in the scantlings.

The pressure of wind is usually deduced from its velocity as recorded by the anemometer (cups) on the basis of Smeaton's formula,[1] or rather Rouse's communicated to Smeaton in 1758, which ignores the important fact that the gravity or density of the wind in motion considerably influences its mechanical pressure. The United States Signal Service by adopting the above formula ignores the importance of density. Professor Draper's cylinder anemometer records the direct wind-pressure, which ought to be preferred to the Signal-Service method. Mr. A. R. Wolff, in the *Engineering and Mining Journal* of September 23, 1876, shows from experiments made on various states of the barometer and thermometer, that a variation in temperature from 0° to 100° Fah., produces a difference in the pressure, for a given velocity, of over one-fifth of the total pressure, air having appreciable but variable weight: thus, when the barometer is 30 inches, and the thermometer 60° Fah., a cubic foot weighs 535 grains, and when barometer is 29.92, and thermometer 32° Fah., a cubic foot weighs 573.53 grains.

When the direction of the wind is oblique to the exposed surface, the force varies as the sine of the angle of incidence. A cylindrical or curved surface is estimated at half the diametric section.

The resistance offered by latticed surfaces to the wind is considerably more than the net area of the lattice bars or braces. It is estimated that there is only about 75 per cent of the interspaces between lattices which does not obstruct the free passage of the wind through the interspaces, and hence in estimating the effective resistant surface of latticed structures to the force of wind, it is usual to add, say, about one-fourth of the interspaces to the area of the braces or lattices, when these represent about one (or somewhat larger) per cent of the entire latticed surface.[2]

The effect on standards of wind-pressure acting upon any loose object, merely resting by its weight upon staging or platform, is practically the same as if it were fixed thereto, so long as the object is standing and not overturned by it, and in such case the bending moment on the substructure is limited to that which is required to overturn the object. The larger the surface exposure, proportionate to the weight of the structure or object for similar bases the less the stability, whether in solid or hollow form. The centre of wind-pressure may be taken as the position of the geometrical centre of the exposed surface.

Wood being specifically lighter than stone, brick, iron, etc., exposes a larger surface in proportion to its weight, in similar solid or hollow forms and positions. The figure and nature of the surfaces exposed, whether plane, corrugated, hollow, or indented, of either material, will influence the degree of the resistance it offers.

The more comprehensively and precisely all dangerous possibilities are provided for, the smaller is the permissible "factor of safety," which may be applied in the design of the structure. This would mean for important structures, economy of materials in providing the same amount of "safety" in the structure, for the reason that a high factor of safety increases the sectional areas of *all* the parts, their joints, connections, etc., indifferently, whereas provision for definite possible dangers only increases the sectional areas, etc., only of the special parts affected thereby.

The Circus Fire at Berdichev. — The fearful loss of life at the burning of the Berdichev Circus a month or so ago is said to have been due in large measure to the fact that, it being New Year's day, half the audience and all the firemen were drunk. The fire originated in a large open cask of kerosene which stood at the entrance to the stable, and from which the lamps were refilled as often as they went out. One lamp hanging above the cask fell into it, and in a moment the building was in a blaze. — *Exchange.*

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[1] The pressure in pounds per square foot of plane surface perpendicular to the wind $= \left(\frac{\text{Velocity in miles per hour}}{200.-}\right)^2$ The formula is $P = V^2 \times .005$.

[2] The British Board of Trade Committee of Inquiry on the wind-pressure on railway structures, reported May 20, 1881, that for railway bridges and viaducts, an effective wind-pressure of 56 pounds per square foot of vertical surface should be the maximum pressure, and that in order to insure a proper margin of safety in respect of wind-strains, the structure should be made strong enough to withstand four times the maximum wind strain; and that in the case of structures in which gravity alone is relied upon to counteract the tendency of wind to overturn it, a factor of safety of *two* is considered sufficient. The committee also recommend that experiments be made to ascertain the lateral extent of exceptionally heavy gusts, for lattice girders (trusses) or those of *open* construction. The pressure on windward girder to be estimated as if a *close* surface, and on the leeward girder: (1) If the surface area of open spaces does not exceed ⅔ of whole area within the girder outline, a pressure of 28 pounds or half the maximum. (2) If between ⅔ and ¾, 42 pounds or ¾, maximum to be allowed, (3) and if exceeding ¾, 56 pounds or maximum pressure to be allowed, as if a *close* structure. The committee found that at Bidston (near Liverpool) Observatory, a self-registering pressure-disc anemometer recorded on one occasion a pressure of 90 pounds per square foot perpendicular, and 80 pounds on another occasion; both were of short duration. They deemed the conformation of the ground in the vicinity induced an intensified velocity. At Glasgow, 47 pounds was the highest pressure recorded. They also found that the abnormal pressures at Bidston were not referable to momentum of moving parts of recording instrument, carrying it beyond the point of equilibrium under the wind-pressure acting at the moment.

THE $3,000-HOUSE COMPETITION. — V.

DESIGN SUBMITTED BY "*Moses.*"

GENERAL SPECIFICATION OF MASON'S WORK AND MATERIALS

REQUIRED in building and finishing a frame cottage in the suburbs of Brooklyn, N. Y., as per plan and this specification submitted by "*Moses,*" architect.

The dimensions, form, and arrangement, to be all in accordance with accompanying plans and detail.

Materials and Workmanship: — All the materials to be of good quality, all work done in a workmanlike, substantial manner, to the entire satisfaction of architect.

Excavation: — The cellar is to be excavated to a depth of 5′ 6″ below general grade of ground. All earth excavated to be graded about the building, as may be desired. Top soil to be kept separate, and placed on top of grading.

Brickwork: — Build the chimneys as per plan, of best quality hard-burned, selected brick, to rest upon footing-course of stone well bedded. Brick to be laid with best quality of lime-and-cement mortar. Carry up flues separate, and parget same, leaving them clear and clean. Chimneys where showing above roof to be neatly pointed up with cement-mortar, and to have a capstone 2½″ thick (with flues cut through) firmly bedded in mortar. Turn proper arches for all fireplaces and prepare for hearths. Face all fireplaces with dark-red, hand-made, hard-burned brick, neatly pointed in red mortar.

Stone-work: — Build the walls of cellar, and all foundations, as per plans, of good building stone 18″ thick, properly bedded and bonded together. All stone-work laid up in lime and cement mortar and neatly pointed, inside and outside. Foundation walls to go 3′ 0″ below ground-level. All walls to rest on large solid slabs of stone about 2′ 0″ wide, 3′ 0″ long and 8″ deep. Furnish and bed solidly 16″ x 16″ x 8″ stone slabs to support veranda and porch steps. Build walls for cellar entrance, outside, to grade, and inclined for receiving doors. Provide sills to cellar doors, and windows: window-sills 4″ thick, 8″ wide: door-sills to be 8″ thick and 18″ wide, properly bevelled.

Lathing and Plastering: — All the walls, partitions and ceilings, soffit of stairs, in first, second and attic stories to be lathed and plastered. The lathing to be done with well-seasoned narrow lath, reversing heading-joints every 18″. All lathing to have two coats — one brown coat, and one sand finish. All angles carried up straight and true. Angle of ceilings and walls to be neatly coved. Arches and beams indicated on second floor to be neatly plastered and beaded.

If required, cut away for and make good after carpenters, and other mechanics.

Conclusion: — Finish and complete all the work to the full and true meaning of the plans and specification, and remove all dirt and rubbish from the premises at the completion of the building.

GENERAL SPECIFICATION OF CARPENTER'S WORK AND MATERIALS.

The dimensions, form, and arrangement, to be all in accordance with accompanying plans and details.

Materials and Workmanship: — All the materials to be of good quality, all work done in a workmanlike and substantial manner, to the entire satisfaction of architect.

Framing: — All the timber for the framing to be of hemlock. Sills 4″ x 6″; plates, 4″ x 4″; corner-posts, 4″ x 6″, made of two pieces, or double, in one length from sill to roof. Floor-beams, 3″ x 8″, 16″ from centres. Beams for veranda and porch 2″ x 6″, 2′ 0″ from centres. Trimmers and headers to be double. Studs on sills of doors and windows, to be double; filling-in studs, and studs for partitions to be 2″ x 4″, 16″ from centers. All floors to have 2″ x 2″ bridging, well nailed to beams. All partitions and outside studding braced.

Rafters: — Rafters 2″ x 6″, 2′ 0″ from centres; ridge-board 1″ x 9″, to which all rafters must be well nailed.

Flooring: — All floors in first and second stories to be Georgia pine, ⅞″ x 3″. Floors in cellar and attic to be of merchantable white-pine 1″ by not over 9″. All to be free from all defects, and well nailed. Flooring of first and second stories to be tongued, grooved, and blind-nailed, properly smoothed off at completion of the building. Hard-wood saddles to be placed at all doors. Flooring throughout to finish snug to outside sheathing and partition-studs.

Stairs: — Put up stairs from first to attic story as per plan and details, risers ⅞″, treads 1¼″, to be built on strong timber carriages, and enclosed in first story as shown, with milled and beaded white-pine boards. The newels, rail, easings, all to be turned, beaded, and moulded, securely placed, and to be of Georgia pine; seat to be placed at start, as indicated.

Cellar stairs, outside and inside, to have 2″ treads resting upon 2″ x 12″ strings. Outside stairs to have inclining doors upon proper timber cheeks. Doors made of milled pine plank, with battens, and hung with wrought-iron strap-hinges, with staple and padlock.

Exterior: — The entire exterior of framework, including the roof, to be covered with hemlock boards 1″ thick, put diagonally, and well nailed to each piece of framing.

First story to be covered with weather-boards, of white-pine, 1¼″

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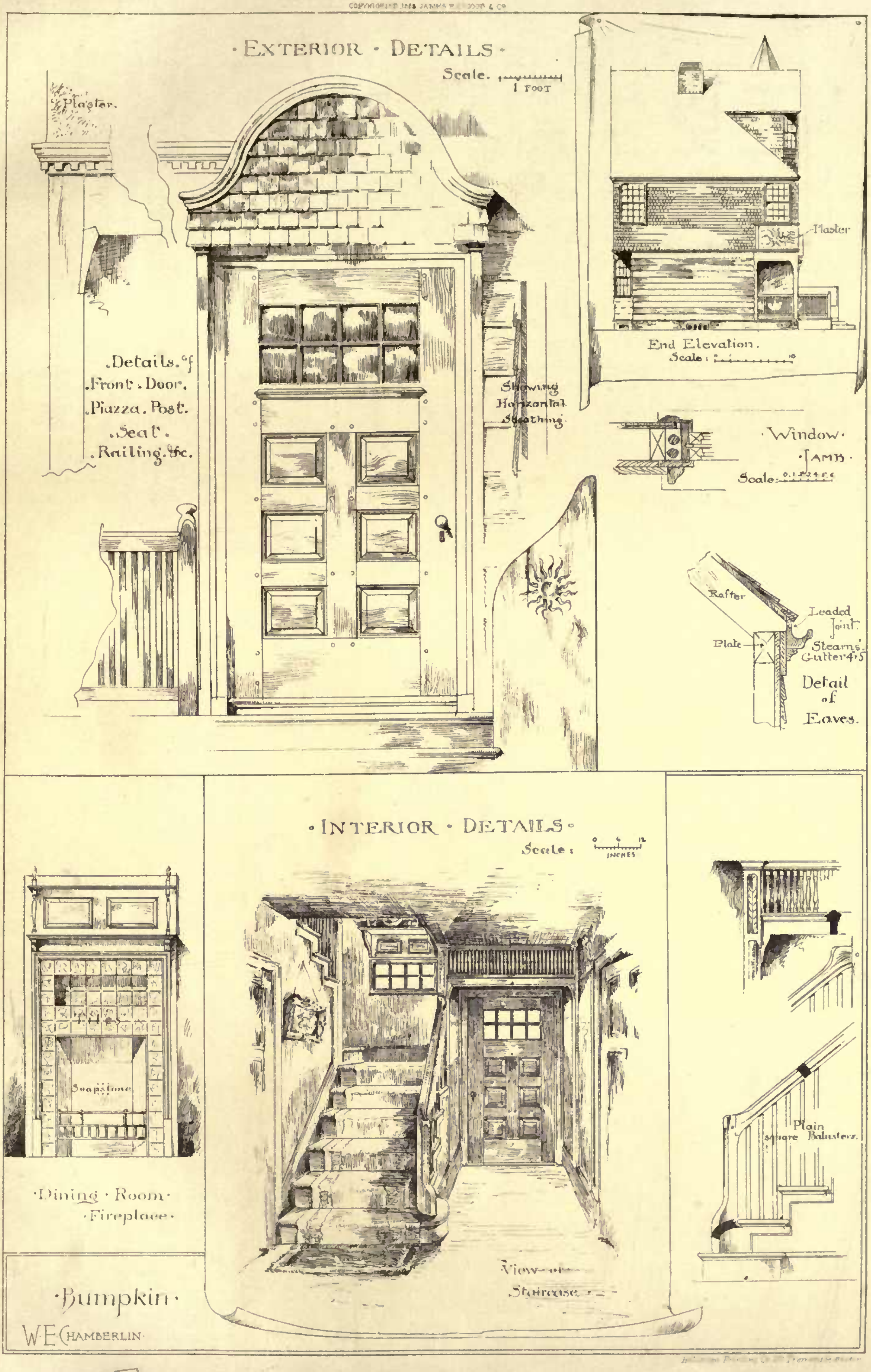

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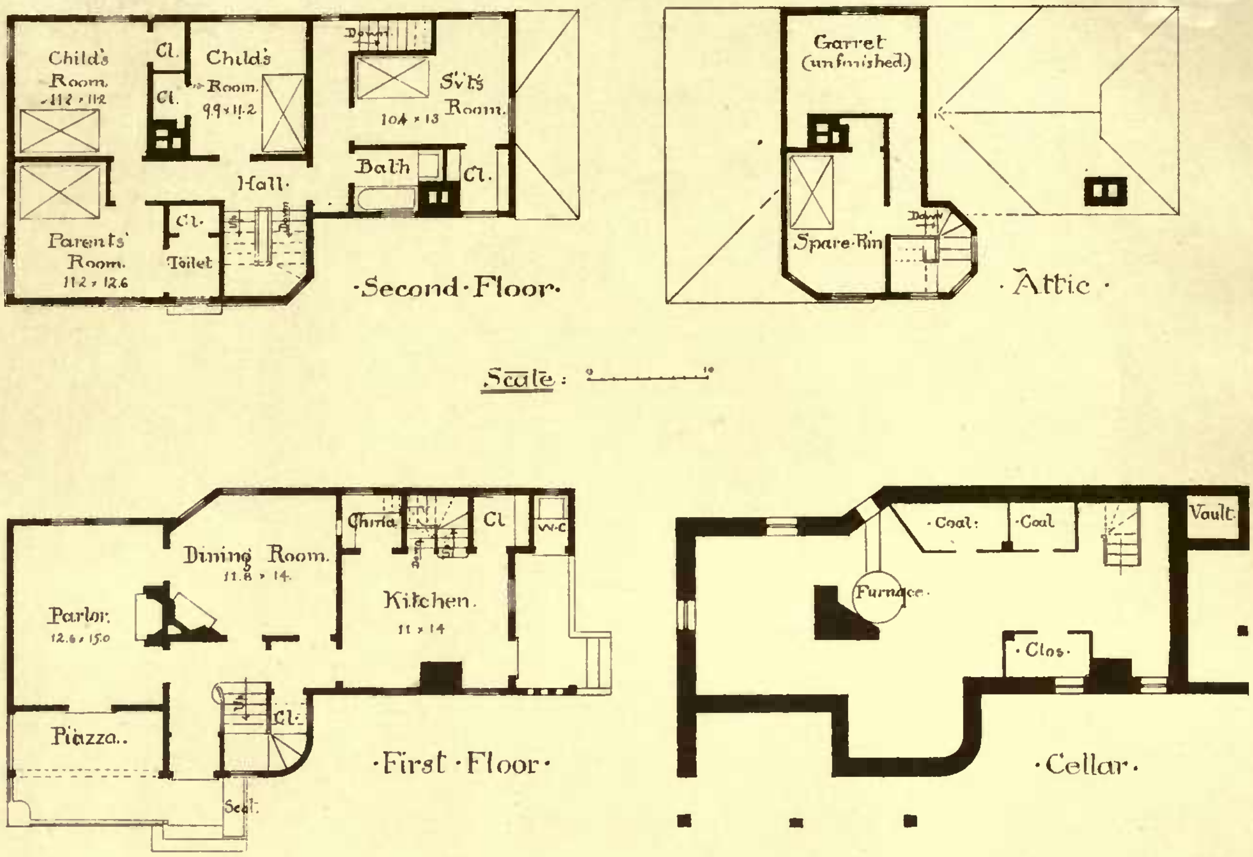

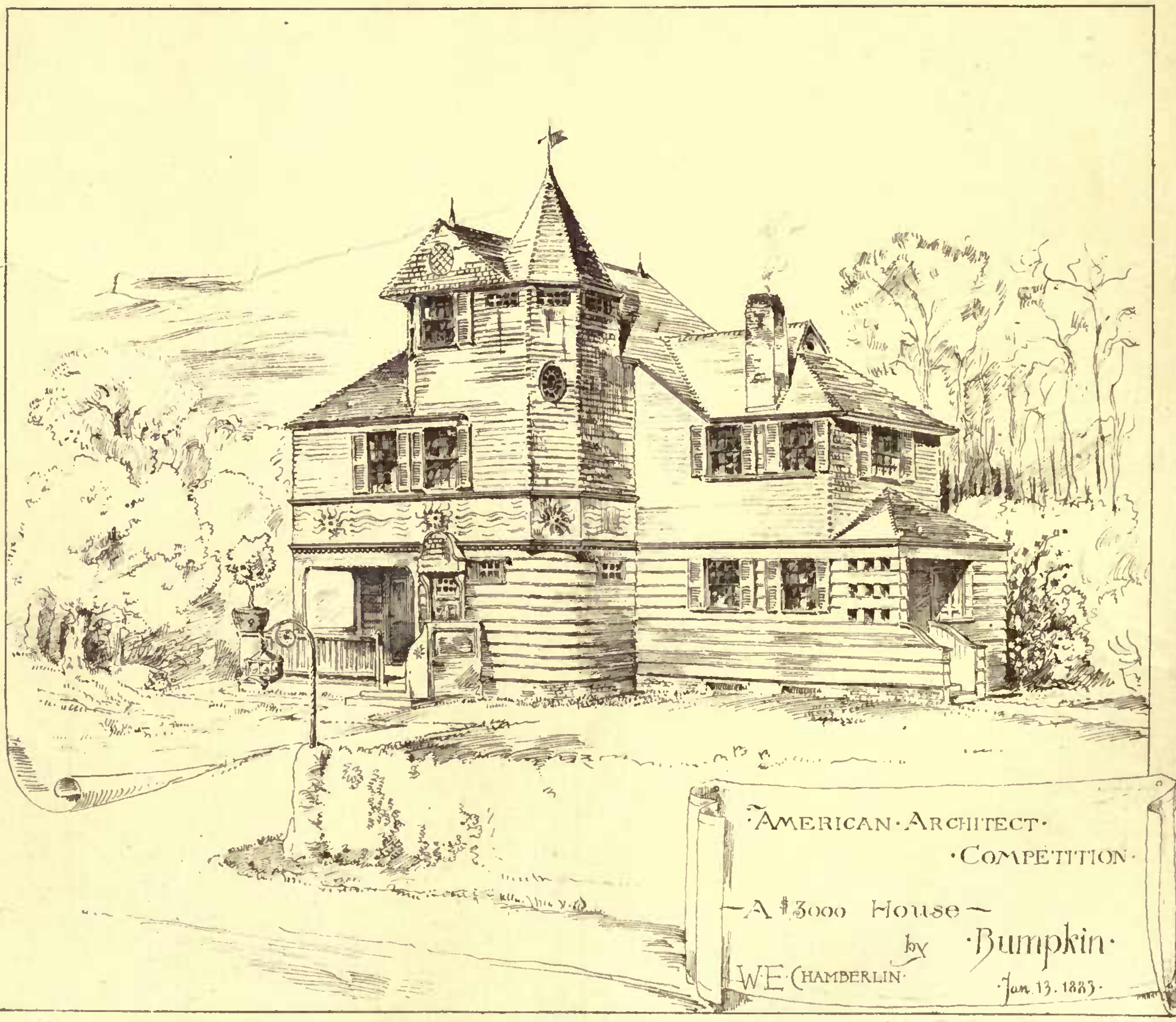

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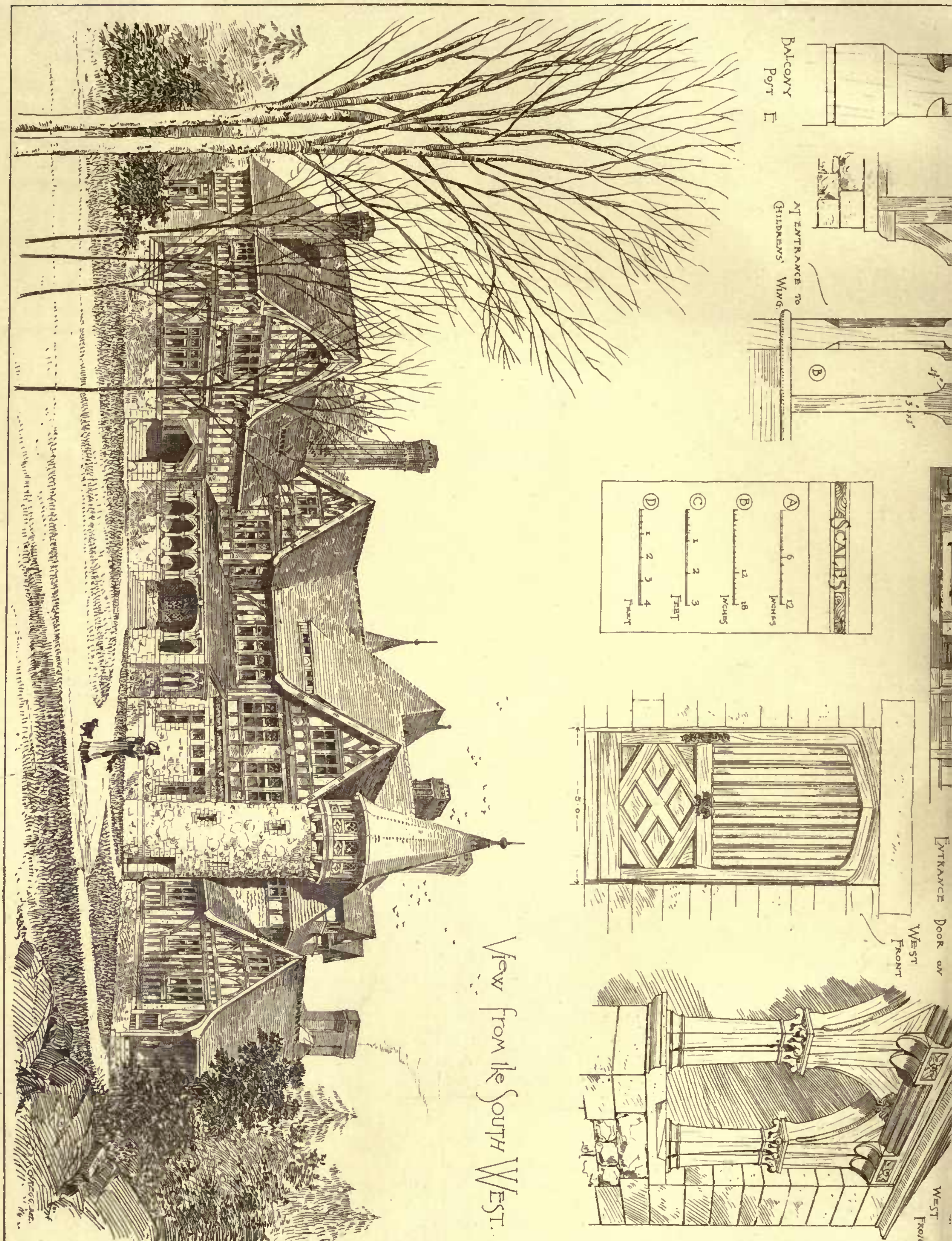

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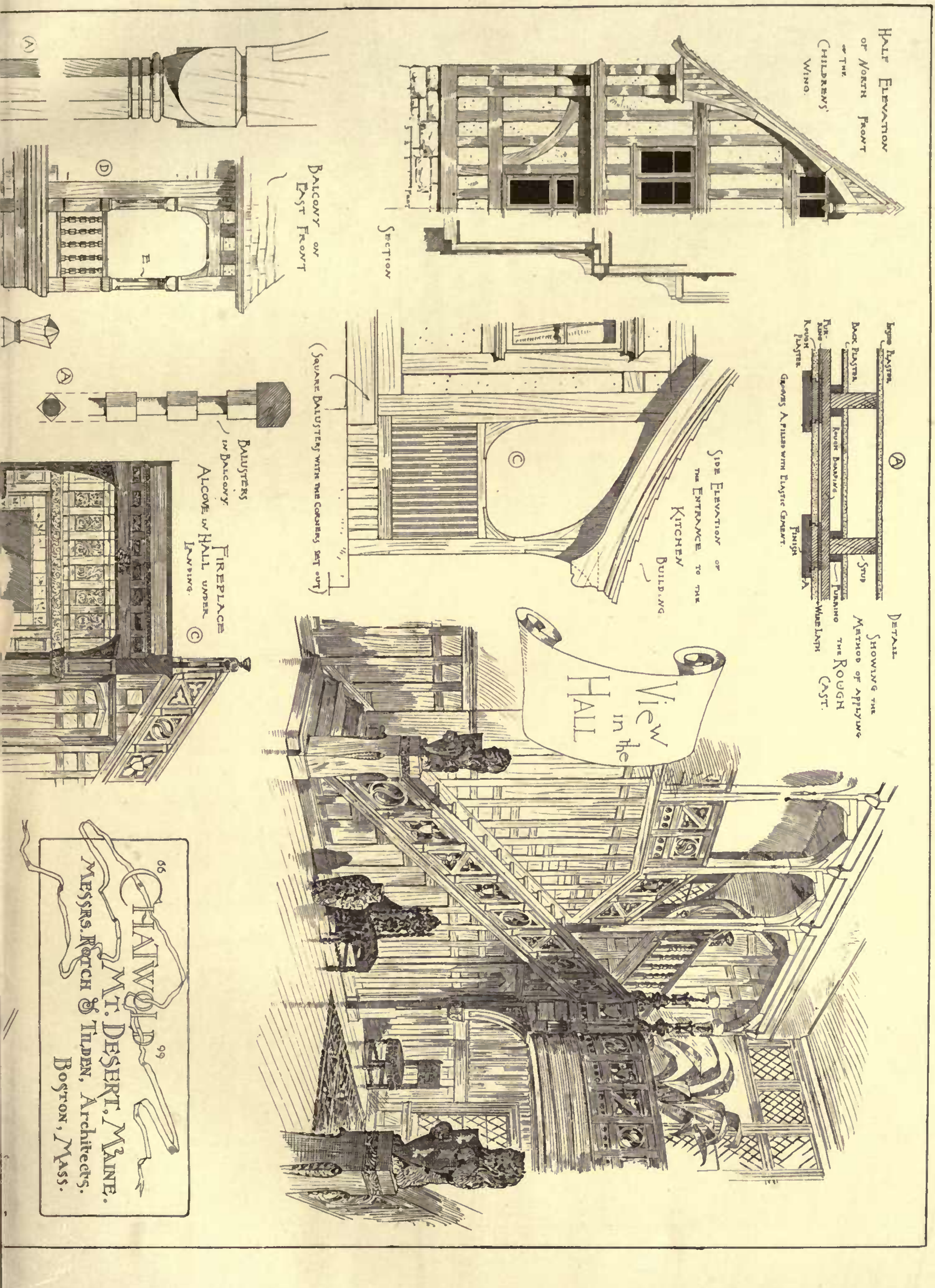

Half Elevation of North Front of the Childrens' Wing.
Section
Balcony on East Front
Detail Showing the Method of Applying the Rough Cast.
Inside Plaster
Back Plaster
Furring
Rough Plaster
Grooves A filled with Elastic Cement.
Rough Boarding
Stud
Furring
Wire Lath
Finish
Side Elevation of the Entrance to the Kitchen Building.
(Square Balusters with the Corners set out)
Balusters in Balcony.
Fireplace Alcove in Hall under Landing.
View in the Hall
"Chatwold" Mt. Desert, Maine.
Messrs. Rotch & Tilden, Architects, Boston, Mass.

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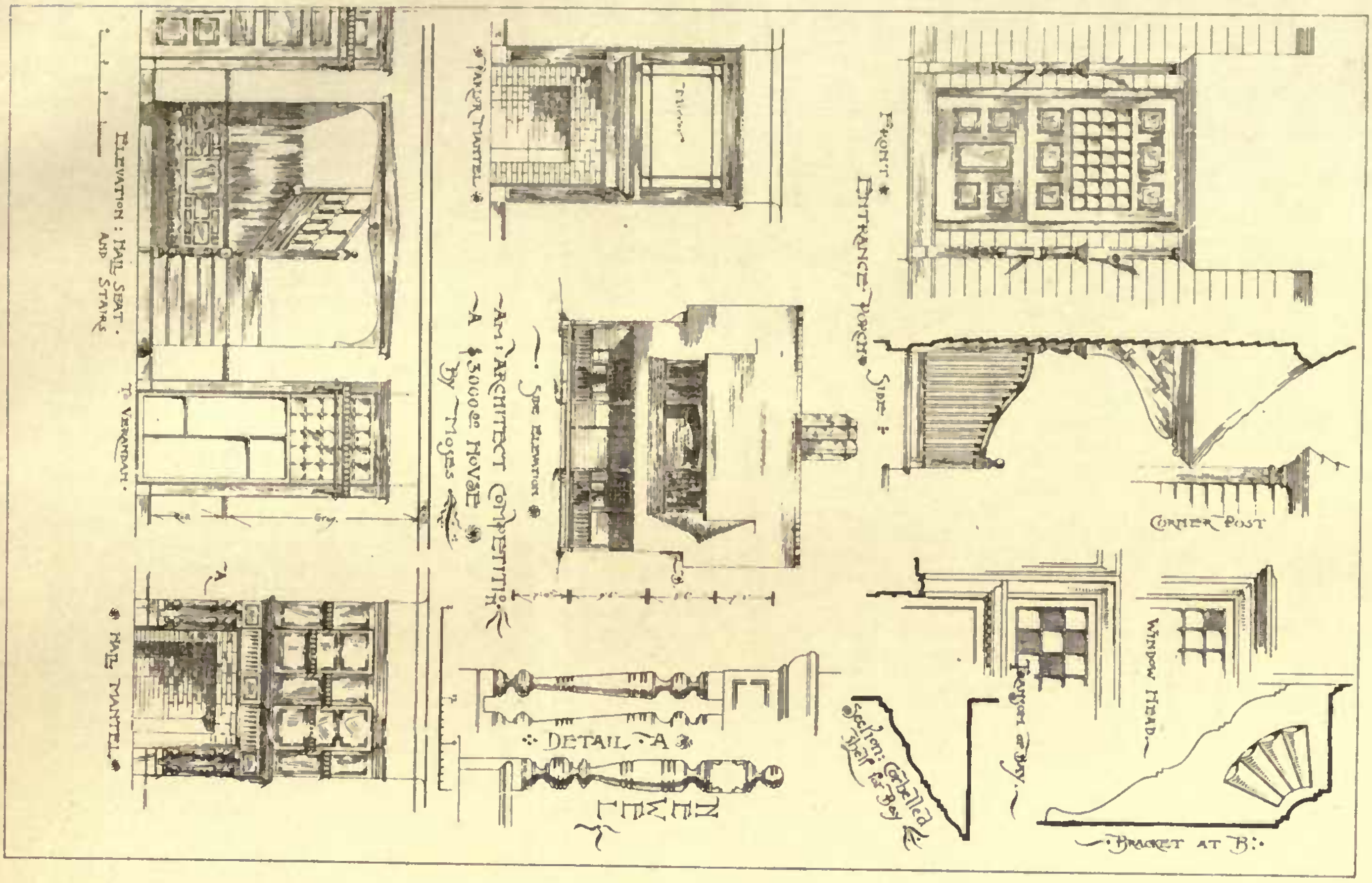

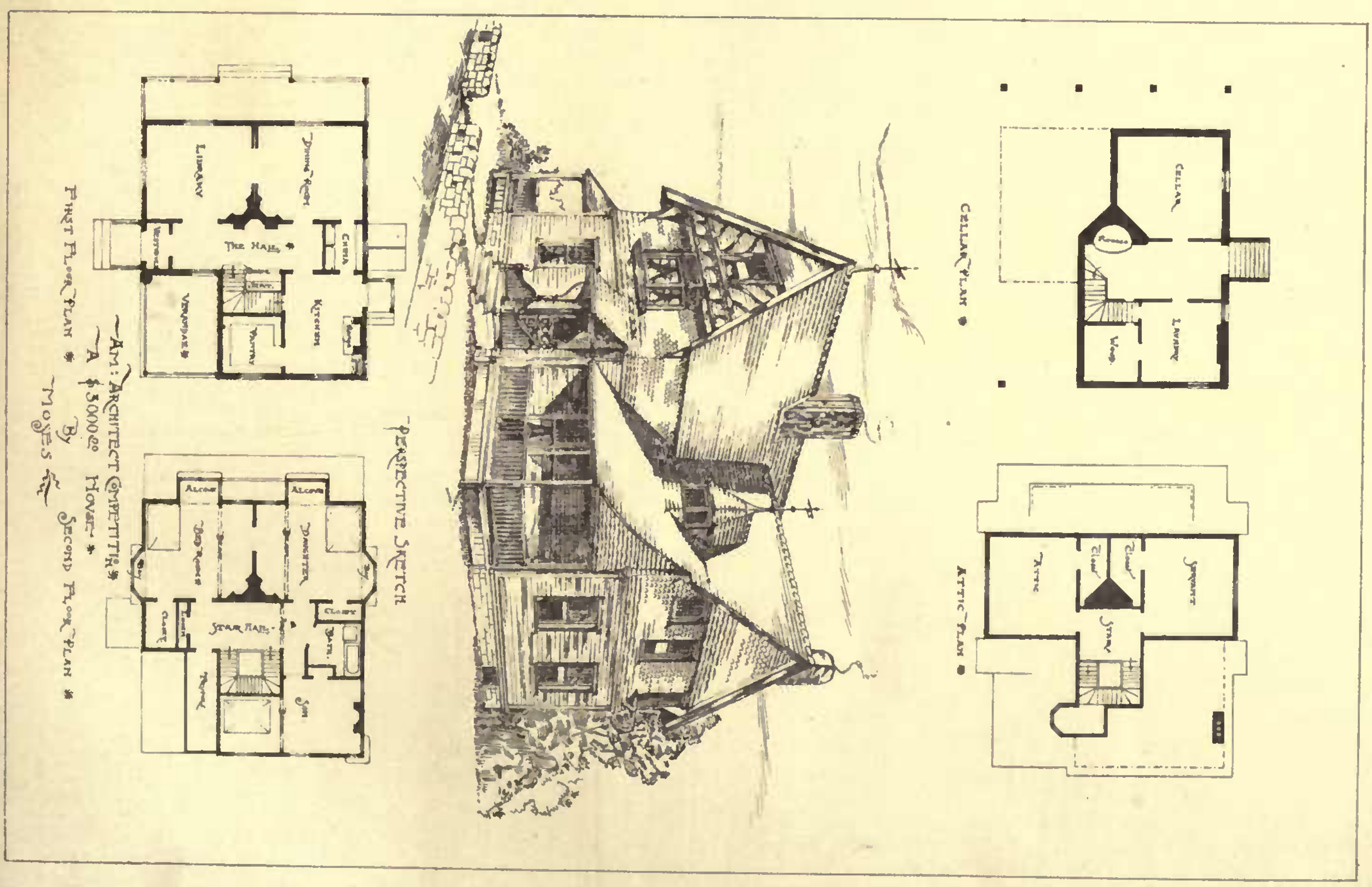

lap. The second story and roof to be covered with cedar shingles. On second story and attic the butts of shingles to be cut in wavy lines, as indicated in design. Shingles to be dipped in red paint before being placed.

Corner boards, outside casings of doors and windows, belt-bands, and mouldings with divisions, barge-boards, etc., to be of white-pine, 1¼″ thick, with the water-table, to be according to sizes and designs indicated.

Verandas, steps and porches to be made as per detail, to rest upon proper posts. All projecting rafters to be planed. Put up rails, newels and balusters. Ceiling of porch and verandas, and all projections of roofs, etc., to be covered with planed, beaded, tongued and grooved white-pine boards, ⅝″ thick.

Doors, Sashes, and Frames: — All doors for interior to be 1⅜″ thick, excepting attic, which are to be 1¼″ thick. Outside doors to be 2″ thick, to be panelled as shown, two divisions in height, each to be hung separately with wrought-iron hinges. The sizes of doors to be taken from drawings, and panelled as shown in design.

All sashes to be 1½″ thick, hung with cords, axle-pulleys, and weights, with box-frames. Cellar sashes hung with butts, and to have iron buttons to each, with hooks to keep them open or closed. All sashes made of white-pine of design shown.

Mantels: — Furnish and set six pine mantels, not to exceed in cost $180.00.

Inside Finish: — All doors and windows in first and second stories to have architraves, brackets and curtain-rods, shelf over as indicated, with plinth-blocks and skirting, all of best clear white-pine, neatly cut, beaded and moulded as shown. Closets to be fitted up with shelves and brass hanging hooks.

Locks, etc.: — All locks in first and second story to be 4″ mortise-locks; outside doors and door to cellar to have bolts, two to each door. To have brass knobs and plates. All other doors to have rim-locks and porcelain knobs. All windows in first and second stories to have patent sash-fasteners. All locks to have duplicate keys.

Tinning and Shingling: — The gutters on roof to be formed with boards on edge, properly graded, and to be lined with I. C. charcoal tin extending 12″ under shingles, properly graded to outlets. Put up tin flashings around chimneys, and in all valleys. To have 4″ tin leaders from all roofs, and closed balcony connecting with 5″ earthenware drain-pipe, to extend to cistern. The leaders to be properly secured to roof with wrought-iron scroll hooks.

The roof covered as above, with dipped shingl‡s, and the ridges capped with simple crest. The front gable and octagonal dormer to have finial, and iron rod and vane.

Bath-room: — Enclose the bath-tub and basin with narrow milled-and-beaded clear ash boards. Wash-basin to have door underneath, with brass hinges and bolt. Wainscot to extend all round room, to height of 2′ 0″ above bath-tub. Provide double lid and riser to water-closet, all to be of ash, and capped with neat B. W. roll cap.

Inside Blinds: — All windows of first and second floors to have inside shutters, 1¼″ thick, of ash, to be hung two flaps in height, each flap in two panels, to have movable slats, transverse bar in centre of each panel; each blind to be cut, rebated and all closely fitted and hung.

Painting: — All the inside work, and outside work, to have two good coats of best American white-lead and oil-paint, as directed by the architect. Tin-work to have two coats, underside to be painted before it is put on. The wood-work to be painted in two colors. The shingles of second story and roof to be painted a light brick color. The outside work and trimmings in two shades of olive.

The stairs to be oiled two coats, and rubbed smooth and dry.

All the work to be thoroughly sand-papered. All nail-holes and other imperfections puttied and shellacked before painting. Should the owner desire, the trim of the various rooms to be oiled, shellacked or stained, instead of painted.

Glazing: — Glaze all the windows throughout with a good quality of American glass, excepting lower sashes of Dining-room and Library, which are to be single-thick plate. The upper sashes of Library and Hall windows to be glazed with cathedral glass. Panel of front door also glazed with cathedral glass.

All this work left clean and perfect, and finally finish and complete all the work to the full and true meaning of the plans and specifications, and remove all dirt and rubbish from the premises at the completion of the building.

ESTIMATE OF QUANTITIES AND PRICES RULING NEAR BROOKLYN, N. Y.

Estimate for building a frame house, according to plans and specifications submitted by "*Moses.*"

Copy of estimate received: —

MASON'S WORK.	
Excavation, etc., 130 cu. yds., @ 25c.	$32.50
Stone-work, 65 perch, @ $3	195.00
Brickwork, 9½ M., @ $13	123.50
Plastering, 590 sq. yds., @ 25c.	140.00
Total	$491.00

CARPENTER'S WORK.	
7,500 ft. studding and framing, @ 2c.	$150.00
3,200 ft. sheathing, @ 2c.	64.00
3,720 ft. shingles	130.00
1,500 ft. weather-boards, @ 3c.	45.00
2,400 ft. Georgia pine flooring, @ 3c.	72.00
1,100 ft. Georgia pine flooring, @ 2c.	22.!0
Sash, doors, interior and exterior trimmings and mantels	$1,000.00
Hardware, nails, etc.	150.00
Tinning	26.00
Stairs	110.00
Plumbing	125.00
Bells	30.00
Painting	380.00
Total	$2,303.00

Mason's work	$ 491.00	
Carpenter's work	2,303.00	
		$2,794.00
Architect's fee, @ 7 %		195.58
Total		$2,989.58
Appropriation		$3,000.00
Contingent		$10.42

[PRIZE] DESIGN SUBMITTED BY "*Bumpkin.*"

"*BUMPKIN'S*" house is supposed to be built in Allston, Mass., near Boston. Labor is as cheap there as anywhere. The Boston market is at hand, railroad accommodation easy, and stone-work cheap.

The cellar walls are of 18-inch rough stone up to grade, and then 18-inch brick wall up to sill.

Walls of first story covered with pine "siding," broad horizontal sheathing 10 inches wide, lapped as shown in detail-drawing.

Above second-story floor-beams shingles everywhere, *left untouched* by paint or stain, to become gray with time.

Rough boarding and lower floors of hemlock. Frame of spruce. Plaster, two-coat work. No wainscoting nor hard-wood finish. Mill windows and doors. Stearns's cypress gutters.

Sizes: — Sills, 4″ x 6″; plates, 4″ x 6″: wall-studs, 2″ x 4″, 16″ on centres; partition-studs, 2″ x 3″, 16″ on centres; first-floor beams, 2″ x 9″; second-floor beams, 2″ x 10″ (the reason for this is that the second story projects in two places, and has many unsupported partitions to carry); third-floor beams, 2″ x 8″; rafters, 2″ x 8″.

ESTIMATE OF QUANTITIES AND PRICES RULING AT ALLSTON, MASS.

The following estimate is based on figures obtained from one of the most reliable builders in Boston.

Except for stone and brick work, the prices quoted for material are *cost* prices, not counting labor nor builder's profit, which will be found added-in at the end.

On the lower floor, without including piazzas, there are 817 sq. ft.; at $3.50 per sq. ft., the house would cost $2,859.50. This, with piazza-work and the architect's commission, would bring the figure very near the $3,055.55, as computed.

"*Bumpkin.*"

Excavation, 5,500 cu. ft. = 204 cu. yds., @ 22c.		$44.88
Cellar Wall (stone) 40 perch, @ $3.56, (laid)		140.00
Brick Foundation (8″ thick) with vault, piazza piers, and 2 cellar piers, 158 cu. ft. (24 bricks to a foot); 3,792 bricks, @ $20 (laid)		75.84
Chimneys, 9,380 bricks, at $20 (laid)		187.60
Frame.	sq. ft.	
Sills, plates, outer walls, and inner partitions	2,790	
First floor	1,288	
Second floor	1,480	
Third floor	300	
Second-floor ceiling-joists	648	
Attic ceiling-joists	220	
Roof	1,166	
Total, @ $16	7,892	126.27
Rough Outside Boarding.	sq. ft.	
First floor	1,311	
Second floor	1,197	
Third floor	384	
Roof	1,405	
	4,297	
Outs, Windows.		
First floor, 14		
Second " 12		
Third " 4		
30 @ 22 sq. ft. =	660	
Total, @ $13	3,637	47.28
Rough Lower Floors.	sq. ft.	
First floor	608	
Second floor	700	
Attic	250	
Total, @ $13	1,558	20.25
Outer Covering.	sq. ft.	
First floor, siding, @ $30	964	28.92
Second floor, shingles	816	
Third and gables, shingles	424	
Roof	1,405	
Total	2,645	
120 ft. to 1,000 shingles. 22 M., @ $3.75		82.50
Windows, 24 large, including sash, glazing, weights, line, sash-fast, frame architraves, and blinds, @ $6.50		$132.00
7 small ones, @ $3.25		22.75
Doors, 28, including hardware, thresholds and architraves, @ $6.50		182.00
Stairs, all told		140.00
Nails		35.00
Upper floors, 1,611 ft., @ $30 (None in garret.)		48.33
Plaster (including lathing).		
Walls.	sq. ft.	
First floor	2,473	
Second floor	3,352	
Third floor	712	
Total	6,537	
Outs.	sq. ft.	
Lower floor, 3 outer doors	85	
" " 11 inside doors	484	
" " 13 windows	195	
Second " 10 doors	440	
" " 12 windows	180	
Third " 3 doors	132	
" " 3 windows	45	
6,537 — 1,561 = 4,978 sq. ft. = 553 sq. yds., @ $.18		99.54
Ceilings		30.25
Plumbing (bath-room and sink only)		150.00
Gutters, 75 ft., @ $.12		9.00
Conductors, 60 ft., @ $.10		6.00
Plaster band on exterior (architect to do the "scratch-work")		8.00
Furnace		150.00
Painting (on outside, the lower story and all mouldings will be painted; shingles left as put on)		125.00
Labor		700.00
Two fireplaces (owner already has tiles)		50.00
Total		$2,641.41
Builder's profit, 10 %		264.14
Architect's commission, 5 %		150.00
Other expenses		150.00
Total		$3,055.55

THE ILLUSTRATIONS.

"CHATWOLD," MOUNT DESERT, ME. MESSRS. ROTCH & TILDEN, ARCHITECTS, BOSTON, MASS.

THE house is situated upon a sheltered cove surrounded by woods, the pines growing to the edge of the rocky shore. The architectural treatment is intended to be bold and rugged. The first story is of rough brown granite with red-granite finish, quarried from ledges upon the place, and set to show weather-worn faces. The round tower is built of red granite boulders. The roofs are shingled, and the second story and wings of half-timbering and rough-cast. The timbering shows the hewn surfaces of hand labor, and

the interior finish is of coarse-grained hard-woods treated with dark stains, and with few mouldings. This severity is relieved by a few points of rich carving.

COMPETITIVE DESIGNS FOR A $3,000-HOUSE, SUBMITTED BY "*Bumpkin*" [MR. W. E. CHAMBERLIN, CAMBRIDGEPORT, MASS], AND "*Moses*."

SHOULD any of our non-professional readers desire to build according to either of these designs, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

RAMBLING SKETCHES, BY MR. T. RAFFLES DAVISON. — BENCH-ENDS, FROM REVELSTOKE.

[From the *British Architect*.]

[In consequence of the printer's negligence we were unable to publish the following description in our last issue.]

FEW more sumptuously-appointed churches exist than this of St. Peter's at Revelstoke, in Devonshire, for it contains no less than a hundred differently carved bench-ends as elaborate as these, whilst the rest of the building is as ornate as sculptured angels, carved bosses, wall-plates, purlins, and ribs can make it. The walls are largely of granite, and are lined in the chancel with an inlaid marble dado and delicately carved oak wainscoting above: this part of the work, including the reredos and stall-ends, being a splendid record of the carver's art in the nineteenth century. In fact I think the reader will agree with me, from the specimens illustrated, that the bench-ends are excellently designed, and form a very good show of what our modern workmen are capable of at their best. Mr. J. P. St. Aubyn, the architect, and his wealthy client must be more than satisfied with the result of the expenditure in carving.

There seem to me in these two examples two types of good work: in the figure of Christ in the seamless robe, of regal dignity; and in the angel panel, of beauty in line and form. Judging from the examples perpetrated, I should say it is not usually easy to make a good angel; but Mr. Hems must get them direct from heaven. Perhaps after all it is a tribute to Devonshire girls, who serve as unconscious models of a refined and simple beauty exactly suited to the purpose. For a small figure I do not remember seeing a representation of Christ with more of divine dignity in modelling and attitude; an excellent figure it would make for a pulpit panel, where folk could see it better than low down in an aisle.

If you have read these notes you may feel some wonder as to how in a remote and poor district, on the sea-coast of Devonshire, it is possible to put up such costly work, for our carvers, as every one knows, like to be very well paid for their labor. The inhabitants are chiefly fisherfolk, and live in a primitive way, not much affected by the deceitfulness of riches. They are indebted to Mr. E. P. Baring, the well-known banker, who is the resident lord-of-the-manor, for building a new church on a new site, above the precipitous banks of the Yealm. The old church stood for ten centuries on the sea-coast quite a mile from the hamlet, and to go that distance and face the wild sea-shore in bad weather was more than many of the old folk could manage, therefore Mr. Baring's gift is one of real benefit. The church has been built without the help of a contractor, but fortunately did not want for an experienced architect, the well-known name of Mr. James Piers St. Aubyn bearing the credit of the design, whilst it was carried out under the personal care of Mr. G. W. Crosbie, the estate clerk-of-works. The work is all very solidly and well executed, with much of the ring of "old work" about it.

THE AMERICAN ARCHITECT COMPETITIONS.

THE AWARD.

AFTER a careful consideration of the large number of drawings submitted for the $3,000-house, the jury awards the three equal prizes of $75 each to the authors of the following designs:

"*Bumpkin*." Mr. W. E. Chamberlin, Cambridgeport, Mass. Cost, $3,055.55.

"*Danfors*." Mr. Sanford Phipps, Boston, Mass., Cost, $3,343.20.

"*B. S. S.*" Mr. A. W. Cobb, Boston, Mass. Cost, $3,146.00.

We will add that a very satisfactory number of persons have applied to us for the names and addresses of the authors of the designs which have already been published in the *American Architect*, from which it may justly be inferred that even the unsuccessful competitors are likely to reap a considerable benefit from their efforts. To save ourselves the trouble of answering similar inquiries we would like to publish with the remaining drawings of the series the names and addresses of their respective authors; but as some may object to have their names associated with an unsuccessful effort we beg that any competitor who feels any such disinclination will at once notify us to that effect, so that we may publish his design over his *nom de plume* only, and furnish his name and address, privately, to such persons as may be inclined to avail themselves of his services.

THE NEXT COMPETITIONS. — MECHANICS' HOUSES.

JUDGING from the remarks of the daily press throughout the country, our recent competition for a $3,000-house has attracted a good deal of attention and favorable comment, and we are strengthened in our belief that one way to justify, in the eyes of the people, the existence of the architectural profession is to show that its members can and will exert their talents for the poor as well as for the rich. We therefore announce the two following competitions, first referring intending competitors to the regulations which govern these competitions, published in our issue for December 23, 1882: —

PROGRAMMES.

I. Our last competition provided for the wants of a man whose income was about five dollars per diem; in the present one we would like to have the competitors turn their attention to a house for a mechanic living on a daily wage of three dollars, who can afford to build only by joining a "building association," or by mortgaging his proposed house, and who, even under such circumstances, ought not to attempt to build a house costing more than $1,500. As it may be fair to suppose that this mechanic and his family are more hardy than more fortunate individuals who enjoy a larger income, he might elect to build, for perpetual occupancy, such a house as the more wealthy would build only for summer use.

The chief essentials in designing such a house are space, good construction, and a careful regard of the limit of expense. The conditions of the present competition are simply that the proposed house shall contain at least six rooms, and shall approximate in cost $1,500. Open fireplaces, bath-rooms, water-closets, furnaces, etc., are to be held as luxuries and not essentials.

Required. A pen-and-ink drawing containing a perspective view of the exterior, plans of both floors and an elevation of one of the sides not shown in the perspective; also as many details as possible. The drawing may measure 14″ x 22″ or 21″ x 33″, to suit the convenience of the designer.

Also, a short reading description, [not a specification] explaining what steps have been taken to keep the cost within the prescribed limit, and a detailed bill of quantities and prices carefully arranged and classified [a great improvement in this respect can be made over many of the schedules furnished in the former competition]. Each competitor is required to obtain an estimate on his design from a trustworthy builder, and furnish the name and address of such builder for publication with the estimate.

For each of the three designs of highest merit a prize of $50 will be paid. No design will be published in the "*American Architect*" previous to the award of the jury, in order that each competitor may have the benefit of the publication of his name and address with his design if he so desires.

Drawings are to be received at the office of the *American Architect*, 211 Tremont Street, Boston, on or before Saturday, April 21.

II. It is possible that two mechanics would perceive the possibility of securing a more commodious habitation by clubbing their purses, and building a double tenement under a common roof. In such a case each tenement might be treated as a distinct dwelling, or it would be fair to suppose that the two mechanics were brothers or intimate friends whose families could live in harmony, and could make use of certain rooms and conveniences in common, as for instance, the kitchen, the dining-room, or a larger parlor in addition to the usual living-rooms of each house. Any competitor who attempts to work out this phase of the problem must take care to keep the privacy of the two dwellings in all other respects well marked. Building thus under one roof, and on a common foundation, each mechanic might expect to obtain a larger dwelling, having at least seven rooms, without materially increasing their combined expenditure, which the competitors must try and keep within $3,000.

Required. A pen-and-ink drawing 22″ x 30″ containing a perspective view; plans of both floors, and an elevation of one side not shown in the view; framing plans at a small scale and all necessary details.

Also, a short skeleton specification, a detailed bill of quantities and prices, and a tender from some reputable builder, name and address being furnished for publication.

For the best designs in the order of their excellence will be awarded prizes of $100, $75 and $50 respectively.

Drawings must be received at the office of the *American Architect* on or before Saturday, May 19, next.

THE $3,000-HOUSE COMPETITION.

PHILADELPHIA, February 14, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — In the criticisms of plans and specifications for a three-thousand-dollar house no allusion has been made to omissions that would prevent the occupancy of such a building if erected as specified. The most serious omission occurs in the specifications and estimates submitted by "*Maximum*," in which no provision has been made for the main stairs. While endeavoring to secure the minimum in estimated cost, the maximum has been certainly acquired in erroneous omissions. Considering the large number of unprofessional readers who are likely to be misled, it would be well for competitors to thoroughly review their plans and specifications, or to so qualify that omissions could readily be provided for. Under no circumstances could a builder be compelled to construct a stairway uncalled for in

the specifications, and his refusal would immediately cause unpleasant relations between the architect, owner, and builder.

Yours, SUBSCRIBER.

[MOST of the competitors, and "*Maximum*" among them, have given to their "skeleton specifications" more substantiality than the programme actually called for, so that the omission of staircases in the specification need not necessarily lay the author open to criticism any more than the omission of any of the other innumerable things that are usually incorporated in a complete specification, but have been omitted from these "skeletons." Moreover, as the drawings form part and parcel of the contract, and the stairs are thereon indicated, and as there is probably ample material for the construction of the stairs included in the lumber called for by the bill of quantities, "*Maximum*" need not fear that he would not be able to compel the builder who undertook the work to build the stairs, though he probably could not compel him to furnish any but the commonest hand-rail, posts, etc. — EDS. AMERICAN ARCHITECT.]

"BUILDING SUPERINTENDENCE."

SURVEYOR'S OFFICE, BOSTON, February 9, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — According to your description of finding stress for roof of Figure 180, "Building Superintendence," XXVI, I find that the king-rod stress is 8,000 lbs., instead of 6,000 lbs., and the strut 4,600 lbs., instead of 3,600 lbs.

The portion of description on wind-pressure is not clear to me, and certain figures and letters are wanting in diagram.

Very respectfully, GEO. F. LORING.

[MR. LORING'S comments are probably quite correct. The sketch of the truss was not drawn to a scale, and the dimensions, as well as the angle of the rafter, were only approximated in the description. The stress-diagram was also drawn at a very small scale — 5,000 lbs. to the inch — to allow of its being successfully photographed. Under these circumstances it is not surprising that his results differ from mine; and so long as the principle is correct, it is not important. For the wind-pressure diagram, however, an apology is certainly due and a better one has already been prepared for use in its place. — T. M. CLARK.]

"CONVENIENT SCALE."

PHILADELPHIA, February 8, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Please give me an inkling as to the meaning of any "convenient scale" mentioned by Trautwine to be used in finding strains, *vide* cut-trusses, p. 247, notes to Figure 5. Am I to understand that by the term "convenient scale" he means the scale of feet employed in making the diagram, and that each division of the scale representing feet equals tons or number of pounds?

By replying to the above in the next issue you will greatly oblige

A STUDENT.

[The "convenient scale" may be, say, 1000, 2000, or 3000 *pounds* to the inch. It has nothing to do with the scale of the diagram. If "Student" will look again at the figure in Trautwine, he will see that for measuring the strains, the weight of half the truss and its load may be represented by any part of the vertical line shown, and that by following the directions for the remainder of the process, the oblique and horizontal strains will be measured by the same scale, whatever it may be. — EDS. AMERICAN ARCHITECT.]

BOOKS.

TOPEKA, KAN., February 14, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Sirs, — I am a subscriber to your valuable paper, and have been for years; this is supposed to give me the right to bore the editor. But seriously, I wish information which I do not know how to obtain otherwise.

I wish to post myself thoroughly upon the domestic architecture of the wide, wide world. I don't know how near I can get to this point — don't know that I can afford to do all this, even if I knew how; but I apprehend you can give me a list of the books I should need to purchase in order to skirmish about the edges of a topic so large; if not of the whole world, then part. I wish to reach the domestic life of the rural classes in particular. This includes houses, barns, habits, etc., with schools and churches, as far as practicable.

I can, if I need to, pay for a half-dozen ordinary books, and more if I must, to make the information perfect. I would particularly like to get at representative facts. I cannot use other than English works, or rather works in English. This doubtless limits me, but I cannot help it. If the giving of this information usually brings with it a fee for the pains, please let me know and I will remit. I would like to have names of authors, publishers and prices.

I do not want American domestic life — I know that already — but English, and Continental Europe, both northern, middle and southern, as fully as possible, and as much over into Asia and Africa as I can secure. I hope I have made myself understood. I shall feel very thankful for a careful reply.

Very truly, J. G. HASKELL.

[READ, for a beginning, Viollet-le-Duc's "Habitations of Man in all Ages," translated by Bucknall; published by James R. Osgood & Co., price, $2.00. Then take up Kerr's "The Gentleman's House," to be had of J. Sabin & Sons, New York, or Estes & Lauriat, Boston, for four or five dollars, or more, according to condition; and continue with Nash's "Mansions of England," small edition, same dealers, $25; Richardson's "Studies from Old English Mansions," same, about $1.00; and consult Cicognara's "Venetian Architecture," Letarouilly's "Edifices de Rome Moderne," Sir William Gell's "Pompeii," and an infinity of other costly books, to be found in most large libraries, for illustrations and details. Viollet-le-Duc's "Dictionnaire Raisonnée," Article "*Maison*," contains invaluable information. Besides these strictly technical works, many picturesque books of travel — "Picturesque Europe," for instance — contain hints which can be used by one who understands what he wants, and any good Dictionary of Antiquities, such as Smith's, gives available information in regard to Greek and Roman dwellings. — EDS. AMERICAN ARCHITECT.]

CALCULATING STRUCTURES.

CHICAGO, February 15, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Will you please let me know through your valuable paper the best way to become master in calculating any kind of architectural structures. I am hardly able to visit a college (none of the kind is in this city) and it would cost me too much to go abroad.

Very respectfully,

A SUBSCRIBER.

[LEARN *thoroughly* algebra, geometry, trigonometry, descriptive geometry, analytic geometry, calculus, and applied mechanics, to get the theory, and then try to get a position in the office of a constructing engineer to learn practice. — EDS. AMERICAN ARCHITECT.]

A QUESTION OF FEE.

CHARLESTON, S. C., February 21, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Some time ago I was requested by a "building committee" to visit their town, examine a lot upon which it was proposed to erect a public building to cost $12,000, and also to make sketches for them of a suitable structure, to get, as it were, "their ideas into shape." They stated that they would pay my "expenses and charges." I propose to charge a per diem in addition to my travelling expenses, for such time as I was out of the city, but do not know what to charge for the sketches. If there is any established practice, will you be so kind as to inform me.

"SUBSCRIBER."

[ONE per cent on the proposed cost is the usual charge for preliminary sketches. — EDS. AMERICAN ARCHITECT.]

THE HEAD-DRESS OF THE STATUE OF LIBERTY.

February 25, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Sirs, — In your last issue you quote from the New York *Times* Mr. Jefferson Davis's account of how the head-dress of the Statue of Liberty, at Washington, came to be changed.

The story is correct enough, except the very important fact that it was Thomas Crawford, not Hiram Powers, who modelled the statue. Mr. Crawford, who told the writer the story, understood the question of *slavery* to be at the bottom of Mr. Davis's objection to a liberty cap. He did not want to see the badge of *emancipation* on the Capitol.

Mr. Crawford's early death prevented his superintending the casting in bronze of the statue, which was carried out by Clark Mills, in 1863.

The *Evening Post* and New York *Daily Graphic* have published corrections of this story, but I see it floating around the country in its original form. It is simply an error of memory on the part of Mr. Davis. Yours respectfully, CHAS. H. WARD.

HINTS FOR IMPROVING THE BUILDING LAWS. — A PERSONAL EXPERIENCE.

NEW YORK, February 19, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Sirs, — As member of a Committee of Architects acting officially with the Building Bureau of the Fire Department in the case of unsafe buildings, I attended on Wednesday afternoon, 31st ult., a conference between the Mayor of this city, the chief of the Building Bureau, and a number of gentlemen connected with building interests. It was held to consider certain proposed amendments to the Building Law, having reference, among other points, to the greater security from fire of our modern many-storied buildings.

Quarter of an hour after, I was fleeing, at a moments' warning, with all the agility my not over limber legs could muster, up the two flights of stairs, already in flames, to the roof of the Moffat Building, corner of Broadway and Worth Streets, having long ago decided that means of egress to afford the likeliest chance of escape in case of the calamity now upon me. Reaching, with others, that temporary haven, I luckily found a ladder, simply a wooden movable one, however, though placed there mainly for just such an emergency, which conveyed me, — without the necessity of a leap that might have broken my legs, or at least sprained my ankle, and made further locomotion difficult—to the roof of the next building. But that ladder had been removed when a few minutes after, a sick woman and a child were dragged out through a window,—through which dense volumes of black smoke were pouring — barely in time to escape the tongues of flame that pursued them. There were willing hands, however, to aid them, and they were pulled through safely, but at the imminent risk of their lives, and only to encounter fresh danger from the midwinter weather; for there had been no time for the sick mother, the

janitor's wife, to gather up so much as a shawl for herself or her little boy.

Meanwhile, there was immediate danger of the buildings we were on, with the roofs of the whole block down to Church Street, catching fire from the burning structure, for there had been some little delay in sending out the alarm to the Fire Department; I was consequently seeking some means of escape to the street. With others I pounded and stamped on one skylight and scuttle after another without effect, the attic floor of mercantile buildings being, I suppose, like that of most others, generally deserted, at least in the daytime; while the heads of the occupants of every story below were probably, as usual under such circumstances, poked out of windows on the lookout for danger to themselves, and so beyond the reach of hearing sounds from within. I should add that in the passage from one roof to another I had to do much clambering and jumping in connection with the topping-out walls that divide the roofs of the various buildings in the block; performances easy enough for any lithe and supple youth, or for the stalwart and alert firemen, long accustomed to the work they do so well and bravely, but hardly to be expected from delicate women and little children, and by no means conducive to the peace of mind of no longer youthful heavy-weights conscientiously intent on getting themselves and others out of the way of a fire close behind. I did not, I assure you, cut all my involuntary pigeon-wings without the obliging assistance of the younger and lighter sort.

This fire, and still more the deluge of water that quenched it, have subjected me to considerable loss and great inconvenience, but nobody has been hurt in life, or so far as I have heard in limb; so that one who found himself safe and sound after seeing but the thickness of a plank between himself and a somewhat grim and undesirable sort of death can well afford to take a Mark Tapleyan view of the situation. Nevertheless, my personal *mauvais quart d'heure* on the roofs has brought home to me certain facts, and suggested to my mind certain safeguards, which I beg to submit to you *pro bono publico*, in advance of the possible embodiment of any of them, in any improved local building laws.

During the last dozen years or so, I have, sometimes in official and sometimes in non-official coöperation with others, done a good deal of hard work both here and in Albany, towards attempting to secure the passage of a New York building law, based, not as the existing one is, on the traditions of a big village, but on the requirements of a great and growing centre of commercial and social activity, and on the exigencies of building operations, which in magnitude and in scientific desiderata, compare with the requirements of a quarter of a century ago, as one hundred units do, say, to ten. But I have learned in the effort that there is a great deal of human nature, not only in legislators, but in their expert advisers, and, without wishing to strike a pessimist note, I should say that in the matter of precautions against damage to life and property from conflagration in high buildings, it might be better for property-holders to anticipate the possible provisions than to wait for the mandates of a perfect building law.

In the first place, then, the roof of a high building being more available as a place of refuge than the street, so far as the occupants of the upper stories are concerned, let it be connected with the other adjoining roofs by means of — not movable wooden, and therefore inflammable ladders, but — stationary iron ones; or rather regular fire-escapes, which cannot be removed and will not succumb to the first action of fire. It may be said that the building laws of our various cities generally prescribe the use, wherever needed, of fire-escapes, within the discretion of the building authorities; but even if so, that does not, at least in New York, ensure those authorities any approach to an adequate force for survey, inspection, and administration. As a matter of fact, the number of fire-escapes in actual use in this city is very small compared with the number really required for safety, especially for that of women, children, and men past the period of agile movement. Let the system of stationary fire-escapes of incombustible material be extended, till the entire roof-system of every block be practically reduced to one level. As fast as the new high buildings born of the elevator system are put up, the inequalities of roof-level and their attendant danger will increase. Top-out walls, as well as enclosing ones, should, if carried up more than, say, a couple of feet, be included for the application of the escapes.

Another point: Let the scuttle of every roof in the block be provided with a bell-pull communicating with a gong on every floor beneath, so that those who escape upwards from a burning building may rouse the occupants of the one they have reached, have the scuttles opened to them, and thereby not only secure for themselves safe passage downward to the street, but give said occupants warning timely enough to enable them, perhaps, to put some of their property, as well as themselves, out of the reach of danger. If the building covers much ground, as in the case of the Moffat building, and the fire begins in the rear, as this did, the flames may make considerable headway before any one knows of the matter, even in the burning building itself, to say nothing of people in the street, or in adjoining buildings. Such was the case in this instance.

I would suggest that it might possibly be found that it would repay the Fire Insurance interest to combine for the protection, at its own expense, of insured property, in the manner above suggested. The cost of strengthening the present inadequate system — so far at least as roof-levels are concerned — of fire-escapes, and of introducing these annunciators would be the merest bagatelle compared with the difference in its favor that would presumably result from decreased expenses, and present expenses in meeting its obligations to its customers after the ravages of fire. As a parallel instance, in my own case, if it had not been for the care and appliances of the Fire Insurance Patrol the property in my quarters would have been lost and damaged to an amount probably double that which has actually occurred.

Objection may be made that the practical reduction of all the roofs of a block to a level "would make things easy for burglars." But the normal condition of a block finished *en permanence* is to have the roof-area level — or nearly so — throughout. Take nearly all the residence blocks up-town for instance; the roofs are already on a level, and so it will be down-town when the modern elevator-building has everywhere taken the place of the existing one. I fancy it would be a very high wall indeed that would stop a burglar intent on entering one of a row of buildings by the roof. Among a burglar's chosen qualifications for such a feat would, I presume, be strength and agility of body, and I suppose that grappling-hooks and rope-lines and ladders are not unknown to his class. And as for the gongs to be communicated with from outside scuttles by persons on the roof fleeing from a fire, they might in fact be included in a burglar-alarm apparatus.

My experience at this fire suggested to my mind several other points of possible improvement on existing conditions of building, but they are minor ones, and I have already sufficiently trespassed on your space. Yours truly, A. J. Bloor.

NOTES AND CLIPPINGS.

Swiss Wood-carving. — The first attempt to introduce wood-carving into Berne was made half a century ago by Christian Fischer, of Brienz, who may be called the father of the art, for after acquiring it himself he taught it to others and founded a school. Besides being an artist in wood Fischer taught music, made musical-boxes, and practised the healing art, but like many other clever fellows he died in poverty. Some time after Fischer began wood-carving at Brienz a certain Peter Baumann began at Grindelwald the making of the miniature Swiss châlets which are now so popular. He afterward removed to Meyringen, where he taught his art to his three sons, one of whom, Andreas, proved to be a genius of the first order, and was equally distinguished for originality in design and skill in execution. He was the first to practise carving in relief. His roses are still regarded as masterpieces, and serve as models for young sculptors. The success of the Baumanns encouraged others to follow their example, and wood-carving soon became a winter occupation in nearly every cottage of the valley of the Hasli. But the sale of carvings and châlets being restricted to foreign tourists in the summer season, principally through the intermediary of hotel porters the trade for a long while was limited and unremunerative. But it struggled on, and in the course of time attracted the attention of local capitalists, who started workshops, opened depots for the sale of their products, and began an export trade which, with some fluctuations, goes on steadily increasing. The business of wood-carving now finds employment for several thousand individuals. In one establishment alone — that of the brothers Worth — 300 to 400 sculptors of both sexes are regularly occupied. Each has his or her specialty, the choice of which is left to individual taste. Some have an aptitude for and excel in the modelling of groups of animals; others give their attention to flowers and plants; others, again, prefer to carve ornamental caskets and build miniature châlets. The women have great delicacy of touch, and their work in certain branches is preferred to that of the men. One thing leads to another, and the abundance of certain sorts of wood in the district suggested the idea of adding to the wood-carving the production of what may be called fancy furniture — carved chairs and tables, napkin-rings, and such like articles. A factory has also been started at Interlaken, and is now in successful operation for making habitable châlets on a large scale. You have only to select your design, give the order, and all the parts of a châlet are sent to any destination, so arranged and marked that an intelligent joiner can put them together, and you have a handsome and picturesque house which you may live in as long as you like, and even carry about on your travels. Another trade which has lately sprung up in the Bernese Oberland is the making of slabs, table-tops, and other articles from the indigenous marbles and granites of the district. A beautiful red stone, soft at first, but which on exposure to the air becomes as hard as adamant, is extensively used for these purposes, and when artistically inlaid with black and white marble is much sought by amateurs of marquetry. Parquetry is also becoming an extensive manufacture. The quantity turned out annually is estimated at 700,000 square feet, and the value of the wood-carvings executed by the sculptors of the Oberland reaches a yearly total of 2,000-000 francs. The number of artisans engaged in the trade is 25,000, and their earnings range from two francs to five francs per day. — *Correspondence of the London Times.*

Westminster Abbey Crumbling Away. — The announcement that Westminster Abbey is gradually crumbling away under the influences of London air will be received with dismay by many to whom even the rending of the tower of Peterborough Cathedral carries no distinct sense of affliction. Yet that the Abbey is doomed to one of two calamities, either to destruction or restoration, seems inevitable. The exterior stone-work has been gradually eaten away by the noxious elements which mingle with the London atmosphere, so that in some places the outer shell of the fabric has already disappeared, and the rubble underneath has come to the surface. The more rough and uneven the outer surface becomes, the more quickly it will corrode, and already the condition of the building is such as inspires the liveliest fears. In these circumstances the Dean and Chapter are reported to have arrived at a decision which is almost as calamitous as though it had been resolved to pull down the Abbey. It is to reface the entire fabric with stone of a more durable character. This means, of course, the obliteration of all that makes the exterior of Westminster Abbey interesting. — *St. James's Gazette.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents herementioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

272,405. WATER-CLOSET, URINAL AND CESSPOOL. — Jean Baptiste Berlier, Paris, France.
272,408. TAP-WRENCH. — Merritt S. Brooks, Chester, Conn.
272,413. SAFETY-ATTACHMENT FOR ELEVATORS. — N. Porter Cleaves, Boston, Mass.
272,417. BLIND-FASTENER. — Arthur C. Dunham, Winthrop, Mass.
272,426. IRON PILE. — Richard Gray and Benjamin R. Abbott, Bloomington, Ill.
272,431-432. HOISTING-MACHINE. — Edwin Harrington, Philadelphia, Pa.
272,436. WALL-PAPER HANGING MACHINE. — Matthew Heiferonn, Cleveland, O.
272,439. HOISTING-MACHINE. — Harry S. Haskins, Philadelphia, Pa.
272,478. TAP-WRENCH. — R. Frederick Rice, Hartford, Conn.
272,517. CHIMNEY-CAP OR VENTILATOR. — Wm. D. Bartlett, Amesbury, Mass.
272,526. PIPE CUTTER AND TONGS. — Joseph W. Calef, North Easton, Mass.
272,531. DOOR-CHECK. — Robert G. S. Collamore, Boston, Mass.
272,539. WATER-CLOSET. — James Foley, Brooklyn, N. Y.
272,541. SPEAKING-TUBE ATTACHMENT. — Fayette Gould, New York, N. Y.
272,551. ILLUMINATING VAULT-COVER OR GRATING-TILE AND SURFACES MADE OF THE SAME. — Thaddeus Hyatt, New York, N. Y.
272,552. SAFETY-GATE FOR ELEVATORS. — William H. Ivers, Dedham, Mass.
272,570. APPARATUS FOR DRAINING AND VENTILATING STORES, ETC. — Edward Mentz and William C. Mentz, Philadelphia, Pa.
272,574. SCREW-JOINT FOR METAL-PIPE FITTINGS. — William A. Miles, Copake Iron Works, N. Y.
272,583. SUCTION-VENTILATOR. — Edwin S. Radcliff, St. Paul, Minn.
272,600. NAIL OR SPIKE. — William Taylor, Pittsburgh, Pa.
272,627. BRACED FRAME. — Frank Henry Beattie, Soho, near Birmingham, County of Warwick, Eng.
272,629. ILLUMINATING TILE. — David G. Beeching, New York, N. Y.
272,638-639. SHINGLE-MACHINE. — John P. Bowling, Guthrie, Ky.
272,642. FIRE-ESCAPE. — Alexander T. Brown, Syracuse, N. Y.
272,657-658. FIRE-PROOF CEILING. — August W. Cordes, New York, N. Y.
272,671. SASH-FASTENER. — Henry J. England, Falls Church, Va.
272,693. AUTOMATIC FIRE-EXTINGUISHER. — Chas. A. Horack, Brooklyn, N. Y.
272,720. VENTILATOR FOR COOKING-STOVES. — John F. Linscott, Grand Rapids, Mich.
272,731. GAUGE FOR RIP-SAWS. — Theodore A. McDonald, New Albany, Ind.
272,751. WINDOW-BLIND SUPPORT. — William W. S. Orbeton, Lynn, Mass.
272,758. DISINFECTING APPARATUS FOR WATER-CLOSETS. — Samuel W. Parker and Henry Blackman, New York, N. Y.
272,786. PROCESS OF MANUFACTURING ARTIFICIAL STONE OR METAL. — Amaury Simon and Victor Pettit, St. Nicolas de Redon, France.
272,796. LOCK. — Elisha P. Teeters, Alliance, O.
272,801. RECESS-PLANE. — Harvey L. Tupper, Rockford, Ill.
272,803. AUTOMATIC FIRE-EXTINGUISHER. — Victor Vankeerberghen, Brussels, Belgium.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report seventeen permits have been granted, the more important of which are the following: —

J. McElroy, two-st'y brick building, e s Clarkson St., between Cross and West Sts.

Jos. Thomas, 4 three-st'y brick buildings, n s Hill St., e of Sharp St.; also, 2 three-st'y brick buildings, e s Sharp St., n of Hill St.

P. S. Chappell, one-st'y brick building, 32' x 85', s s Cross St., between Riverside and Covington Sts.

Mrs. C. S. Kraft, two-st'y brick stable, e s Morton Alley, n of John St.

F. C. Fossett, three-st'y brick building, e s Belair Ave., n of Hoffman St.

W. S. Isaacs, 3 two-st'y brick buildings, e s Kirby Lane, n of Franklin St.

Albert Mahone, 14 three-st'y brick buildings, e s Fulton St., cor. Tennant St.; 15 three-st'y brick buildings, w s Mount St., s w cor. Tennant St.; 12 three-st'y brick buildings, s s Tennant St., between Mount and Fulton Sts.; 13 three-st'y brick buildings, e s Mount St., cor. Tennant St.; 10 three-st'y brick buildings, n s Tennant St., between Mount and Fulton Sts.

Levi C. Condon, 2 three-st'y brick buildings, w s Mount St., n of Tennant St.

C. A. Singewalt, 2 two-st'y brick buildings, e s Harris St., s of Hudson St.

John Snyder, two-st'y brick building, w s Gist St., n of Hampstead St.

Estate of Henry Ward, four-st'y brick building, e s Charles St., cor. of Bank Lane.

ADDITIONS AND ALTERATIONS. — T. Harrison Garrett, Esq., is making an alteration in the dining-room, and erecting two bay-windows to his residence on Charles-Street Ave.; cost, $5,000; Messrs. J. A. & W. T. Wilson, architects.

Boston.

INSURANCE BUILDING. — The Massachusetts Hospital Life Insurance Company proposes to erect on State St., near Exchange St., a building costing $1,000,000.

THE UNITARIAN BUILDING. — Over $52,000 has been contributed, up to date, toward the erection of the new Unitarian building in this city.

BUILDING PERMITS. — *Brick.* — *Washington St., Nos.* 515-521, Ward 10, for Fred L. Ames, mechanical, 56' 4½" and 64' 4" x 101' 9½", six-st'y pitch; Wm. M. Rumery, builder.

Wood. — *Crescent Ave.*, rear of, near Cambridge St., Ward 4, for Chas. J. Miers, storage, 22' x 25', one-st'y flat; Mr. Spence, builder.

Commercial St., near Ellsworth St., Ward 24, for P. & M. Finnegan, store, 23' x 30', one-st'y flat; Michael Ryan.

O St., cor. East Seventh St., Ward 14, for Emanuel E. George, manufactory, 17' x 28', one-st'y pitch; C. A. Flower, builder.

Prospect St., No. 16, Ward 3, for Chas. Robinson, Jr., dwell., 11' 6" x 32', and 22' x 32', three-st'y flat; Geo. M. Starbird, builder.

Prospect St., No. 22, Ward 3, for Chas. Robinson, Jr., dwell., 12' x 30' and 22' x 30, three-st'y; Geo. M. Starbird, builder.

Prospect St., No. 26, Ward 3, for Chas. Robinson, Jr., dwell., 11' 6" x 24' and 22' x 32', three-st'y; Geo. M. Starbird, builder.

Saratoga St., No. 679, Ward 1, for Benj. McKissick, dwell., 17' and 22' x 44'; ell, 14' x 27', two-st'y mansard; Jas. H. Coffin, builder.

Greenwich Pl., rear, near Dorchester Ave., Ward 24, for John Hogan, stable, 22' x 24'; one-st'y hip.

Bodwell Park, rear, near Bird St., Ward 20, for John J. Merrill, stable, 12' x 15' and 20' x 20', one-st'y pitch; Alton G. Reed, builder.

ALTERATION. — Alteration in store of J. H. Pray, Son & Co.; cost, $6,000; J. L. Faxon, architect.

Brooklyn.

BUILDING PERMITS. — *Beaver St.*, w s, 20' n Park St., 4 two-st'y frame tenements, tin roofs; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, T. Englehardt.

Tompkins Ave., s w cor. Floyd St., 2 three-st'y frame tenements, tin roofs; cost, total, $9,500; owner, Geo. Wheeler, 75 Devoe St.; architect, T. Engelhardt; builders, Sachs & Armendinger and J. Rueger.

Diamond St., *Nos.* 94 *and* 96, e s, 250' n Nassau Ave., 2 three-st'y frame double tenements, gravel roofs; cost, each, $3,450; owners, Lodima A. Parks, 110 Norman Ave., and Allen A. Raynor; architect, F. Weber; builders, P. Newman and S. F. Bartlet.

Herkimer St., n s, 75' w Ralph Ave., three-st'y frame double tenement, tin or gravel roof; cost, $3,500; owner, architect and builder, G. R. Waldron, 1906 Atlantic Ave.

South Fifth St., n s, 82' e Fifth St., two-st'y and basement brick dwell., tin roof; cost, $3,500; owner, Eugene Titus, South Fifth St., n e cor. Fifth St.; architect, C. W. Cardwell; builders, —— Seaman and Cardwell & Hawks.

Columbia Heights, w s, 37' 6" Clark St., 2 four-st'y brick dwells., tin roofs; cost, total, $30,000; owner, E. R. Squib, 152 Columbia Heights; architect, H. Dudley; builder, P. Castner.

Lafayette Ave., n s, 193' 9" w Lewis Ave., 11 two-and-a-half-st'y frame dwells., tin roofs; cost, each, $3,500; owner, architect and builder, P. F. O'Brien.

Fifty-second St., n s, 100' e Third Ave., two-st'y and basement frame dwells.; cost, $2,300, owner, R. Klein, One Hundred and Twenty-fifth St., N. Y. City; builders, Firth & Van Pelt and Spence Bros.

Van Brunt St., No. 317, e s, 50' s King St., four-st'y brick double tenement, tin roof; cost, $3,000; owner, Jane Walsch, on premises; builder, W. Phealan.

Utica Ave., n w cor. Bergen St., 5 two-st'y frame dwells., tin roofs; cost, each $1,600; owner, Benj. Evans, 1562 Dean St.; architect and builder, Geo. Evans.

Monroe St., s s, 235' w Howard Ave., two-st'y frame tenement, tin roof; cost, about $3,500; owner, Mrs. S. A. Putney, Broadway, near Lafayette Ave.; builder, M. Metzen.

Bedford Ave., s e cor. Lexington Ave., four-st'y brownstone front store and flat, gravel roof; cost, $10,000; owner, Thos. H. Brush, 74 Fourth Ave.; architect, F. E. Lockwood.

Chicago.

FLATS. — W. H. Drake is building nine flats on s w cor. of Jackson and Lincoln Sts., three-st'y, 73' x 80'; to cost $36,000.

DWELLINGS. — W. H. Drake has also completed plans for six two-st'y dwells., the contracts of which are already let, for O. D. Wetherell, on Prairie Ave., cor. of Ray St., to cost about $35,000.

OFFICE-BUILDING. — Messrs. Burnham & Root, architects, have completed the plans for one of the most extensive and tallest office-buildings in the United States, for Mr. P. D. Armour, and Mr. S. A. Kent, on the lot just south of the new Board of Trade building. Its dimensions will be 175' on Van Buren St., and 142' on both Sherman St. and Pacific Ave., twelve-st'y and basement in height, and its shape will be three sides of a quadrilateral, the open end being on Van Buren St. The building will be constructed of brick and stone, and will be absolutely fire-proof. It is estimated that it will contain 350 offices.

HOUSE. — Mr. C. E. Clarke, of Boston, has just received a contract to build a house for Judge Tree, of this city.

BUILDING PERMITS. — Catherine Downing, two-st'y and basement brick store and dwell., 414 Taylor St., 25' x 40'; cost, $4,500.

Theodore Kaiser, two-st'y brick dwell., in Block 6, 22' x 50'; to cost $3,600.

Ricke & Hibbard, three-st'y basement brick stores and flats, 60' x 110', Larrabee & Geuter Sts.; to cost $25,000.

F. D. Reynolds, two-st'y brick dwell., 48' x 66', Johnson Pl.; to cost, $9,000.

Henry Delaney, two-st'y basement brick dwell., 24' x 50', 2819 Cottage Grove Ave.; to cost $5,000.

Oliver Tremain, two-st'y basement brick flats, 247 Loomis St.; to cost $3,500.

John Gerson, two-st'y basement and attic brick dwell., 22' x 90', 566 North Ashland Ave.; to cost $7,000.

Streeter & Tucker, two-st'y brick flats, 22' x 58', 89 Laflin St.; cost, $4,000.

John Novak, three-st'y brick flats, 22' x 62', 151 Bunker St.; to cost $5,200.

M. Traznick, three-st'y basement brick store and flats, 24' x 70', 176 West Twelfth St.; to cost $5,700.

F. A. Hibbard, two-st'y and basement brick dwell., 21' x 51', 28 Eugen Ave.; to cost $5,000.

R. W. Dunham, brick dwell., 54' x 60', 3905-3909 Lake Ave.; to cost $15,000.

O. D. Wetherell, 6 two-st'y basement brick dwells., 54' x 125', 2933-2943 Prairie Ave.; to cost $30,000.

Henry Valk, two-st'y and basement brick store and dwell., 26' x 75', Robey St., cor. of Twenty-second St.; cost, $5,000.

Kleinke & Heinrich, two-st'y basement brick dwell., 21' x 50', 916-918 North Ashland Ave.; to cost $7,000.

M. Buckley, two-st'y basement brick livery stable, 48' x 95', 130-132 Twenty-ninth St.; to cost $12,000.

J. A. Sackley, two-st'y and attic brick dwell., 21' x 40', 310 Walnut St.; to cost $3,000.

H. Schwnchow, two-st'y basement brick flats, 20' x 58', 215 Lincoln Ave.; to cost $7,000.

C. H. Case, two-st'y brick dwell., 24' x 42', 986 Harrison St.; to cost $3,000.

Chas. Last, two-st'y basement brick store and dwell., 28' x 64', 689 Twentieth St.; cost, $5,000.

John West, two-st'y brick flats, 25' x 61', 196 Winchester Ave.; to cost $6,000.

Albert Crane, 4 brick cottages, 20' x 38', Emerald St., near Thirty-first St.; to cost $3,200.

C. J. Hull, 4 two-st'y brick dwells., 24' x 28', Ashley St.; to cost $7,000.

Fred Greisback, two-st'y brick stores and dwell., 44' x 50', Freeman and Geuter Sts.; cost, $6,000.

L. E. Hickmott, three-st'y brick dwell., 25' x 54', 1057 North Clark St.; to cost $6,000.

J. H. Chambers, two-st'y basement brick addition to dwell., 17' x 45', 694 Washington St.; to cost $4,000.

E. B. Washburne, three-st'y brick flats, 25' x 63', 73 Maple St.; cost, $8,000.

John Gallagher, two-st'y brick flats, 44' x 54', 2938-2940 Groveland Park Ave.; to cost $8,000.

Henry Scherer, two-st'y basement brick warehouse, 24' x 62', 426 Blue Island Ave.; to cost, $3,600.

Thomas Ball, three-st'y basement brick dwell., 23' x 40', 615 Loomis St.; cost, $2,500.

A. J. Snell, three-st'y brick store and dwell., 48' x 65', 443-455 West Randolph St.; cost, $9,000.

S. Marshall, two-st'y brick dwell., 20' x 50', 310 Webster Ave.; cost, $5,000.

B. A. Hill, two-st'y brick dwell., 20' x 42', 1119 Fulton St.; to cost $2,500.

Cincinnati.

FACTORY. — The Krebs Lithographing Co., are to build a brick building for their business, lot, 50' x 100'. Building five stories high, and will cost $30,000; location, Sycamore St., near Fifth St.; architect, Jas. W. McLaughlin.

HOUSES. — Mrs. A. Duglo is building a two-st'y frame dwell. on Mt. Hope Road; to cost $4,500; Mr. Theo. A. Richter, architect; builders, Friend & Morton.

Mr. Richter has also prepared plans for an 8-room frame dwell., Price Hill, for Mr. I. H. Hart, to cost $4,000.

Also, J. H. Marling, frame dwell. at Norwood; to cost $6,000.

New York.

ALTERATIONS. — The "*World*" office on Park Row is to be altered, and a new front built from designs of Messrs. Bruce, Price & Freeman.

The three buildings on the s w cor. of Broadway and Thirty-third Sts. are to be altered into a hotel for Mr. James Trainor, from designs of Messrs. D. & J. Jardine.

The United States Medical College will have extensive additions and alterations made to the building, No. 9 East Twelfth Street, recently purchased by them, from designs of Mr. Jas. L. Farnsworth.

The Stuart Mansion, n w cor. of Broadway and Twentieth St., which is to be occupied as a store by Messrs. Herter Bros., is to be raised one story, and two extensions of about 43' x 146', and 35' x 62' added, from designs of Mr. William Shickel. The improvements will cost $70,000.

APARTMENT-HOUSES. — For Mrs. Elizabeth Seitz, an apartment-house, 50' x 75', five stories and basement, brownstone front, is to be built at a cost of about $50,000, on Park Ave., 25' south of Eighty-fifth St., from designs of Mr. Jos. M. Dunn.

From designs of the same architect an apartment-house, 50' x 60', of Philadelphia brick with Ohio stone finish, five stories and basement, to cost about $30,000, is to be built for Mr. George Shepherd, at Nos. 321 and 323 West Seventeenth St.

COTTON EXCHANGE. — The following-named architects have been invited by the Building Committee of the Cotton Exchange to submit competitive plans for their new building: Messrs. Geo. B. Post, R. F. Hatfield, Thos. Stent, F. Carles Merry, H. J. Schwarzmann & Co., and Mr. Julius F. Munckwitz.

STORE. — Mr. H. Edwards Ficken is preparing designs for the fitting up of the new store of Messrs. Van Tine & Co., the Japanese importers, with shelving and other fittings in the Japanese manner.

STABLE. — Mr. Ficken is also preparing plans for a stable and coach-house for Mr. D. L. Suydam, at No. 110 West Thirtieth St.

BUILDING PERMITS. — *Third Ave., No.* 805, five-st'y brick tenement, tin roof; cost, $12,000; owner, Christian Just, 1911 Third Ave.; architect, J. Kastner.

East Fifty-sixth St., No. 319, five-st'y brick tenement, tin roof; c[illegible] $17,500; owner and builder James Brady, 180 [illegible] Eightieth St.

Mulberry St., No. 276, four-st'y brick tenement, tin roof; cost, $10,000; owners, Trustees of St. Patrick's Cathedral, 270 Mulberry St.; architect, James E. Ware.

Columbia St., No. 6, five-st'y brick tenement, tin roof; cost, $14,000; owner, Angellar E. Lyons, 48 Pitt St.; architect, W. Graul; builder, Thomas Lyons.

Washington Ave., w s, 60' s of One Hundred and Seventy-third St., three-st'y frame dwell, slate and tin roof; cost, $6,500; owner, Sereno D. Bonfils, s e cor. Washington Ave. and One Hundred and Seventy-third St.; architect, Thos. E. Thompson.

Third Ave., w s, 116' s of One Hundred and Sixty-sixth St., two-st'y brick store and dwell., tin roof; cost, $9,000; owner, Chas. A. Edel, 1161 Third Ave.; architect, W. W. Gardiner.

Norfolk St., e s, 150' w Rivington St., five-st'y brick tenement, tin roof; cost, $13,000; owner, Philippina Haffoer, 655 Water St.; architect, A. H. Blackenstein.

Forty-fourth St., n s, 275' w of Ninth Ave., 2 four-st'y brownstone flats, tin roofs; cost, each, $20,000; owners and builders, Thomas Moore, 339 East Seventy-ninth St., and Bernard Wilson, 339 East Fifty-eighth St.; architects, Thom & Wilson.

Seventh Ave., s e cor. Twenty-ninth St., five-st'y brick factory, tin or gravel roof; cost, $20,000; owners, Behr Bros., 138 Harrison St., Brooklyn; architect, Julius Kastner.

One Hundred and Twenty-ninth St., s s, 150' w of Sixth Ave., 2 five-st'y brick flats, tin roofs; cost, $48,000 and $20,000; owner and architect, Wm. J. Merritt, 115 Broadway.

Fifty-eighth St., s s, 200' w of Sixth Ave., 3 four-st'y brick dwells., tin roofs; cost, each, $12,000; owner, Fred Rosenberg, 419 Claremont Ave.; architect, Geo. W. Da Cunha.

Sixtieth St., n s, 48' w of Madison Ave., 3 four-sty brownstone front dwells., tin roofs; cost, two, each $35,000, and one $30,000; owners, architects and builders, Chas. Buek & Co, 63 East Forty-first St.

Lexington Ave., n e cor. Forty-fifth St., 5 four-st'y brick dwells., tin roofs; cost, total, $85,000; owners, architects and builders, Chas. Graham & Sons, 305 and 307 East Forty-third St.

One Hundred and Thirty-eighth St., s s, 75' Southern Boulevard, four-st'y brick tenement, tin roof; cost, $13,000; owner, Patrick Whelan, One Hundred and Thirty-eighth St. and Southern Boulevard; architect, Frank E. Verder.

Alterations.— *East Houston St., No. 276*, raise two stories; $2,500; owner, Geo. W. Moore, on premises; architect, Wm. Graul.

Twenty-fourth St., s s, 187' w of Broadway, to be connected with Fifth Ave. Hotel, raise three and part four stories, new front and rear walls; cost, $40,000; owner, Amos R. Eno, 8 Pine St.; architects, D. & J. Jardine.

Broome St., n w cor. Pitt St., raise one story; cost, $2,500; owner, Bernhard Stern, 460 Grand St; architect Thos. J. Beir.

West Twenty-third St., No. 18, one-st'y brick extension, new store front and internal alterations; cost, $10,000; owner, Sarah L. S. Guernsey, on premises; architects, D. & J. Jardine.

Washington Ave., s w cor. One Hundred and Seventy-third St., raise extension one-st'y and mansard roof; cost, $3,000; owner, Anna D. Bonfils, on premises; architect, Theo. E. Thomson.

Broadway, Nos. 1412 and 1414, second, third, fourth and fifth stories altered for hotel purposes; cost, $25,000; owner, John Brower, One Hundred and Eighth St. and Western Boulevard; architect, Henry F. Kilburn; builder, not selected.

University Place, Nos. 34 and 36, repair damage by fire; cost, $7,500; owner, Fred Hazeltine, 31 East Sixty-seventh St.; architect, Sam'l Warner; builder, John D. Miner.

Broadway, No. 55, raise portion of building one story; cost, $3,000; owner, H. H. Houston, Philadelphia; architects, Babb & Cook; builders, not selected.

Liberty St., Nos. 92 and 94, raise two stories; cost, $10,000; owner, Chas. Schlesinger, 143 West Fourteenth St.; architect, Emil Gruwe; builder not selected.

West Thirtieth St., Nos. 511 and 513, raise one story, and a four-st'y extension on westerly side, gravel roof; cost, $12,000; owner, Chas. A. Kuster, Bella Sylva, Pa.; architect, Wm. Kuhles; builder, not selected.

South Fifth Ave., No. 37, four-st'y brick extension, gravel roof; cost, $6,000; owner, John M. Williams, 561 Hudson St.; architect, J. C. Markham.

Canal St., Nos. 208 and 210, repair damage by fire; cost, $4,100; owner, John R. Graham; builder, Henry Wallace.

West Thirty-first St., No. 150, one-st'y brick extension, to connect front with rear building; cost, $4,000; owner, W. H. Tailer, 22 West Thirty-third St.; architect, Jas. L. Breere; builders, McKenzie & McPherson.

Houston, Sheriff and Second Sts., Union Market, internal alterations; cost, $14,000; owners, Police Department of New York City; architect, N. D. Bush.

Fifty-fifth St., s s, 375' e of Seventh Ave., repair damage by fire; cost, $4,500; owners and builders, John W. Hogencamp & Son, 935 Eighth Ave.; architects, D. & J. Jardine.

Broadway, s w cor. Thirty-third St., three-st'y brick extension; cost, $10,000; owner, Edward A. Morrison; lessee, Jas. Trainor, 145 East Thirty-seventh St.; architects, D. & J. Jardine.

Philadelphia.

Factory. — Jas. Neuman contemplates the erection at n w cor. Eleventh and Race Sts., of a manufacturing building, to be of brick, and five stories high, 66' x 110'; will have an ornamental iron front on Race St.

Hospital Ward.—A new ward building is to be built for the Presbyterian Hospital, Thirty-ninth St., cor. Powelton Ave.; Wilson Bros. & Co., architects.

Houses. — Jas. E. Dingee, Esq., is having prepared plans for 56 houses, (three-st'y), to be erected on Nicholas St., bet. Twenty-fourth and Twenty-fifth Sts.

Jno. L. Carre, Esq., is about to build 76 houses in the vicinity of Twenty-fifth and Oxford Sts.

Police Station.—Second District station-house, 50' x 100', front and part of sides to be of enamelled brick and brownstone, balance in pressed brick, walls inside lined with glazed brick; cost, $35,000; builder, J. N. Pattison; Geo. W. Hewitt, architect.

Building Permits.—*Thirty-fourth St.*, w s, n of Race St., 2 three-st'y dwells., 30' x 50'; J. E. & A. L. Pennock, contractors.

Sixth St., n w cor. Cherry St., two-st'y brick building, 18' x 37'; D. M. Blyler.

Brown St., s s, e of Fourth St., three-st'y dwell. and saloon, and addition to ice-house, 28' x 54'; J. Kramer, contractor.

Eleventh St., w s, n of Westmoreland St., two-st'y dwell., 14' x 30'; Jas. H. Dorf, contractor.

South Eleventh St., No. 818, two-st'y store, 16' x 40'; A. & G. McElwee, contractors.

Twentieth St., s o cor. Tasker St., one-st'y warehouse, 19' x 48'; Jos. Parker, contractor.

Scott St., No. 820, two-st'y dwell., 16' x 58'; H. McAnany, owner.

Beekmans St., w s, two-st'y dwell., 16' x 26'; Wm. McAvoy, owner.

Herman St., s s, e of Hancock St., one-st'y factory, 24' x 28'; Chas. O. Roop.

Twenty-sixth St., n e cor. Federal St., three-st'y dwell., 18' x 35'; Jas. Hamilton, owner.

Erie Ave., n s, two-st'y dwell., 16' x 40'; Jacob Marsh, owner.

Tenth St., s w cor. Girard Ave., third-story addition to dwell., 16' x 36'; N. S. Bowers, owner.

Pear St., No. 1906, two-st'y stable, 18' x 26'; J. J. O'Neill, owner.

Twenty-first St., w s, n of Race St., two-st'y smith and wheelwright shop, 18' x 71'; D. McQuillan.

Moore St., n s, w of Delaware Ave., two-st'y factory, 48' x 127'; Baugh & Sons, owners.

Leithgow St., w s, n of Norris St., two-st'y dwell., C. H. W. Keyser.

Pear St., No. 1501, two-st'y dwell., 14' x 36'; W. H. Martin, owner.

Johnson St., n s, w of Twentieth St., five-st'y storehouse, 35' x 90'; J. B. Doyle, contractor.

Alder St., No. 1228, three-st'y dwell., 14' x 29'; Thos. E. Day.

Fifth St., n of Huntingdon St., 2 three-st'y stores and dwells., 18' x 48'; E. C. Sheppard, contractor.

Cherry St., w of Twenty-first St., three-st'y dwell., 18' x 46'; W. J. Grifford, contractor.

Philip St., n of Norris St., 4 two-st'y dwells., 12' x 28'; A. T. Richards, contractor.

Elm St., No. 3623, three-st'y dwell., 14' x 40'; Sam'l Bowers, owner.

Fletcher St., w Twenty-seventh St., two-st'y dwell., 18' x 40'; Jno. McConaghy, contractor.

Ringgold St., s of Parrish St., 5 two-st'y dwells., 14' x 28'; Frank Black, contractor.

North Second St., No. 5, three-st'y store, 18' x 36'; W. F. Wilkins, contractor.

West Girard Ave., No 1214, two-st'y shop, 17' x 27'; Wm. F. Maner, owner.

Twenty-second St., n of Pine St., two-st'y stable, 63' x 110'; A. A. Catanach.

Alteration. — *South Third St., No. 36*, alteration to banking building; Wilson Bros. & Co., architects, Philadelphia.

General Notes.

Bridgeton, N. J.—Mulford & Son are to build a large paper mill here for the manufacture of manilla paper.

Cambridge, Mass.—Ground is to be broken for the new physical laboratory as soon as the weather permits.

Cambridge, Mass.—It is reported that a gift of $250-000 has been made by citizens of Cambridge to Harvard College, to be disposed of in the erection of new dormitories, in which the rent of each room shall not exceed $50 a year.

Claremont, N. H. — Several new dwellings are in process of construction.

The First Universalist Society are making alterations and additions to their church; cost, $5,500; architect, H. R. Beckwith.

Cleveland, O. — C. A. Wallingford, architect, of Indianapolis, has residence B. Perrin; $10,000.

Conanicut Island, R. I.— A house is being built at the Dumplings on Conanicut Island, for C. W. Wharton, of Philadelphia; and the plans for a house have been drawn to cost about $35,000, and to be located near by, for Job Wharton, also of Philadelphia. A cottage is also to be erected on the island for Benjamin Shoemaker, of Philadelphia. $5,000.

Corning, Io. — C. H. Elmendorf is excavating for an opera-house, three stories high, 30' x 100', and costing $18,000, from plans by C. F. Driscoll, of Omaha. Mr. Elmendorf is also erecting a business building, 22' x 100', costing $6,000, plans from same.

Crawfordsville, Ind. — C. A. Wallingford, architect, of Indianapolis, has residence of Judge Blair;

Curbytown, N. Y. — The sum of $5,000 has been subscribed toward the erection of a new Reformed Church edifice.

Cummings, O. — The Calumet Iron and Steel Company has commenced to rebuild the nail department of their works at Cummings, which was recently destroyed by fire, and expects to have the mill rebuilt within a couple of months. The nail mill is to be of frame, and the nail house of brick. It will probably cost about $200,000.

Danvers, Mass.—Messrs. Martin, Clap and French are preparing to rebuild their factory.

Dedham, Mass. — Land for the site of the new Dedham Boat Club house has been purchased. The building will be 32' x 85'. The estimated cost is $2,500.

Dolgerville, Herkimer Co., N. Y. — For Mr. A. Dolger a stone felt factory, with office, is being built, to cost about $45,000, from designs of Mr. Wm. Kuhles, of New York.

Dover, N. H. — The project of a summer hotel on Garrison Hill is being agitated.

Dubuque, Io. — M. M. Walker, Esq., is having plans prepared for a two-st'y frame house, to be built on Grove St., at a cost of about $8,000.

Edgewood, Md. — Mr. W. F. Weber, architect, Baltimore, is preparing drawings for a frame cottage, 34' x 53', for Allen Hoffman, Esq., and to cost $3,500.

Evanston, Ill.—Messrs. Edbrooke & Burnham are to build for G. P. Dunham, a $10,000 house.

Wm. Rebman, Esq., has let the contracts for the erection of a two-st'y frame brick veneered house, to be built on Bluff St., at head of Fifteenth St., at a cost of about $5,000.

Messrs. Levens & Dillion are preparing to remodel and enlarge their wholesale store on Main St.; cost not estimated; F. D. Hyde, architect, furnishes the plans for these.

Fall River, Mass. — The Fall River correspondent of the *Providence Journal* says that large purchases of land by New York parties in the vicinity of Horseneck Beach are reported. It is also rumored that a large hotel enterprise is contemplated, which will add much to the watering facilities of that section.

The stockholders of the Flint mill have voted to rebuild.

Frankfort, Ky.—The plans of Mr. C. J. Clarke, architect, of Louisville, for an opera-house here, have been submitted to the City Council.

Germantown, Pa. — Tourison Brothers, carpenters and builders, of Mt. Airy, are erecting a three-st'y back building to the residence of Thomas Garrett.

Great Barrington, Mass. — The officers of the Methodist Church have voted to build a parsonage on F. Landsdorff's land in the vicinity of the old parsonage.

George Chadwick is building a dwelling on the east side of the river.

Hastings, Neb. — The town has laid foundations for a $20,000 brick and cut-stone school building, C. F. Driscoll, of Omaha, architect.

Harlem, N. Y. — The new church of the One Hundred and Nineteenth Street Methodist Episcopal Society in East One Hundred and Eighteenth St., will be one of the finest buildings in that part of the city.

Harlan, Io. — P. B. Hunt and P. F. Murray are building residences to cost not far from $4,000 each. C. F. Driscoll, of Omaha, architect.

Hartford, Conn. — The vacant lot on Hopkins St., opposite the High School, has been purchased by P. E. Reed, who is to erect a block of French flats, of brown stone.

Holyoke, Mass.—G. A. Phelps is having plans drawn for a substantial residence which he will build on corner of Pleasant and Lincoln Streets in the spring.

John Daniels is building a two-tenement house on South Main St.

Keene, N. H. — Gen. S. G. Griffin will erect a wooden building in the rear of his brick block early in the spring. The first floor will be occupied by two wholesale stores; the second floor will contain the hall and ante-rooms for the Grand Army, a reading-room and armory for the Keene Light Guard battalion, and Dickinson's laundry; and on the third floor will be a drill-hall, 70' x 75'.

Kirkman, Neb. — Geo. Eokars is erecting a dwelling house costing $5,000, after plans by C. F. Driscoll, of Omaha.

Knoxville Borough, Pittsburgh, Pa. — W. W. Knox, Esq., is about to build a pair of dwelling-houses, to be followed by others as the Spring opens; plans by Willis G. Hale, Philadelphia, Pa.

Lafayette, Ind.— C. A. Wallingford, architect, of Indianapolis, has on hand: residence, Lewis Falley, $10,000; residence, J. O. Perrin, $6,000; residence, J. J. Perrin, $4,000; opera-house, $10,000.

Lansing, Mich. — L. D. Grosvenor, architect, of Jackson, Mich., is said to be preparing plans for a large hotel to be built the coming summer for Hon. O. M. Barnes.

Manayunk, Pa. — It is reported that the Catholics will soon build a new church with the money left by Barnard McCann. The legacy was $150,000.

Manchester, Mass. — The total cost of the new edifice of St. Paul's Methodist Church, including lot and furnishing, will be $32,330, and the entire amount has been subscribed and nearly all paid in.

Pittsfield, Mass. — It is reported that Hascal Dodge will build a block at the corner of Francis Ave. and Railroad St., for light manufacturing.

Reading, Pa. — The city intends to build a brick engine-house at a cost of $7,000.

PROPOSALS.

Steam-Heating Apparatus.
[At Lafayette, Ind.]

Sealed proposals will be received at the auditor's office of Tippecanoe County, Ind., at the city of Lafayette, **until 10 o'clock, A. M., of April 18th, 1883,** for low-pressure steam-heating and ventilating apparatus, including boilers, pumps, tanks, etc., for the heating and ventilating of the new Court-House at Lafayette, Ind., now being built, and for the heating of the jail of said county, according to the plans and specifications, which are now on file in the auditor's office of said county. All persons bidding will be required to submit full and complete description of their apparatus with their bids, and samples of their work so far as the same is practicable. All bids to be filled out according to blanks to be had of said auditor for the use of bidders, and by inserting amounts for work bid for, and without additional conditions and qualifications. Each bid must be accompanied with a good and sufficient bond in a penalty of not less than one-fourth of the amount of the bid signed by at least two responsible resident freehold sureties according to sections 4245 and 4246, revised statutes 1881, conditioned, that if awarded the work, the person or persons making said proposals will enter into a contract, and give the bond required in the specifications.

Blank bonds will be furnished by the said auditor of said county, and if sureties do not reside in Tippecanoe County, their sufficiency and goodness beyond any doubt should be certified to by the clerk or auditor of the county where sureties do reside.

Copies of specifications, and any additional information in regard to the proposed work may be obtained of James F. Alexander, Superintendent, Lafayette, Ind.

The Board of Commissioners reserves the right to reject any and all bids, if in its judgment the interests of the county should so require.

By order of the Board of Commissioners of the County of Tippecanoe.

377 THOMAS J. BARNES, Auditor.

(Proposals continued on page ix.)

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE promoters of the Meigs Elevated Railroad scheme in Boston have issued a cheap-looking broadside setting forth the advantages of their system, and containing a copy of the bill now pending before the Massachusetts Legislature for the incorporation of a company to carry it into execution. So far as the rights of property-holders are concerned, there is certainly nothing to complain of in the provisions of the bill. No location can be acquired in any city or town without the assent of the selectmen or aldermen of the place, after a public hearing, and any location so granted may be revoked at the end of one year, at the discretion of the town or city authorities, who may require the structures of the company to be removed and the territory restored to its original condition. In all cases the gauge of the tracks, and their height above the ground, is to be subject to the approval of the municipal officers, and the road, wherever built, is not to be opened to travel until the safety and strength, both of the track construction and the rolling-stock, have been tested and approved by the Railroad Commissioners, or an engineer appointed by them. In regard to injury to abutting estates, the bill provides that the owner of any property taken by the railroad, or of any property not so taken, but in any manner injured or lessened in value by the construction, maintenance or operation of the road, may petition to have his damages assessed, and the damages awarded are to constitute a first lien upon all the property of the corporation. It certainly seems as if the promoters had tried to provide for allthe ob jections which any person could fairly urge against their plan, and there is something to be said in behalf of the great mass of people who are anxiously waiting for some improvement in the tedious and unwholesome means of locomotion which they are now condemned to use.

A BILL, similar to that which very nearly became a law in New York a year or two ago, has been presented to the Legislature of Wisconsin, providing that every owner of a hotel or other building more than two stories in height, which has an elevator, shall construct a shaft for the same of boiler-iron or solid brick masonry, to extend not less than six feet above the roof of the building. The shaft is also to be provided with an automatic opening at the top, and with automatic doors of iron or wire, to be operated by the elevator-platform as it ascends or descends. The bill further requires that the elevator shall be so constructed as to form at its base an air-cushion, to prevent injury in case of the breaking of the ropes. The penalty for disregarding these provisions is a fine of not less than one thousand or more than five thousand dollars, or imprisonment in jail for not less than six nor more than twelve months, or both, at the discretion of the court. The great objection to this, as to all other bills of the kind, is that although calculated to promote the public safety it would compel the owners of elevators to make use of at least two patented appliances, to the profit of the persons who control the patents. In the present case, the bill has the air of being intended to serve certain private ends, in a way which would cast discredit upon the best of laws, and until it can be cleared of all suspicion of this, it certainly ought not to pass.

THE occasion for the presentation of this measure is undoubtedly to be found in the public feeling aroused by the burning of the Newhall House, which speculators would be likely enough to try to take advantage of. More disinterested persons in the community have shown their desire to help in preventing similar calamities for the future by suggesting such improvements in methods of construction as occur to them. One of the most sensible among these writes to the Milwaukee *Sentinel*, pointing out that the spread of the Newhall-House fire, although promoted, perhaps, by the free passage afforded for the flames through the combustible elevator-shaft, would have been almost equally rapid if there had been no elevator-shaft at all, since the hollow furrings and stud-partitions presented conduits in every portion of the house through which the fire could, and did, run easily from story to story, unobserved, and inaccessible. In the opinion of this writer, the protection of shafts, and the provision of fire-escape ladders, is of small importance in comparison with the adoption of some mode of construction by which the communication of fire by means of partitions and furrings from one story to another, and among the rooms on each story, shall be prevented. Such modes of construction are in use, and although hardly yet perfected every expert in building knows the ends to be sought, and the means available for the purpose in view; and if either the law or public opinion could once be brought to regard the ordinary hollow wooden construction with the dislike and suspicion which it deserves, inexpensive and effectual modes for remedying its dangerous character would soon be devised.

A BILL to compel telegraph and telephone companies in cities to place their wires underground has passed to its third reading in the New York State Senate. It provides that after March, 1885, no wires or poles shall be permitted above ground, and as it is very likely to become a law, the officers of the companies interested will probably be obliged to set themselves at work in earnest to devise some unexceptionable means of laying and using subterranean lines. The Western Union Telegraph Company has taken the lead, and in a few months the two thousand wires which now enter its main building on Broadway will probably all be concealed beneath the surface. One of the principal difficulties in the way of burying electric-wires seems to be the imperfect character of the means of insulation now in use. At present gutta-percha is the material most available, but this is not very durable, and is, besides, melted by a comparatively slight heat, so that it runs down, and leaves the wires exposed. In the streets of a city so compact and so modern as New York there are many sources of heat, which may injure cables placed near them, and the pipes of the steam-heating companies have occasioned the destruction of many insulated wires buried near by. One of the greatest needs of electrical practice is a better insulating substance than any yet employed, and the discoverer of such a material will reap an ample reward. The telephone lines, owing to the much greater sensitiveness of the instruments used upon them, are generally assumed to need more careful insulation than even those of the telegraph, but a singular story has been reported in one or two of the technical journals, to the effect that a certain "line-man" in a western city, while intoxicated, carried some wires without insulation, simply securing them to the posts by iron staples, and that these wires were found just as serviceable, even in rainy weather, as those running over glass insulators; so that the company who employed this unconscious inventor afterwards built many miles of uninsulated line, and used it with perfect success.

THE Bulletin of the Archæological Institute of America for January, 1883, gives evidence of great activity on the part of its agents, as well as of the increasing public interest in the matters with which the Institute deals. The explorations at Assos, under Messrs. Clarke and Bacon, have progressed steadily, and although the Bulletin only mentions results very briefly, the editors preferring to leave detailed descriptions for

the special report, it is evident that many interesting discoveries have been made. The platform of the Stoa, that picturesque and stately promenade above the town, overlooking the bay, has been excavated with great care, and the remains of the Agora, or market-place, the council-hall, a bath-house and an adjoining temple, have been exposed, measured, drawn and photographed with such success that, in the words of the Bulletin, "it seems probable that when the work is completed, the remains at Assos will not only present the most perfect idea of a Greek city that is anywhere to be obtained, but will afford a better insight into the life of an antique city than is to be gained even from the streets and houses of Pompeii." The Street of Tombs has also been the subject of special investigation, and many fragments of sculpture, with minor works in terra-cotta and metal, have been found, together with several interesting inscriptions, one of which records the burial of the Archon Basileus and of the Basilinna, his wife, showing that the institution of the archons, established in Athens after the downfall of the tyrants, was closely imitated in the colonial city across the Ægean. Although not, perhaps, the most interesting, the most important discovery in some respects is that of works of fortification belonging to at least six different epochs, all in a state of preservation which permits their complete restoration. Like the stone bridge below the city, the only example of such a structure of Grecian workmanship which has ever been discovered, the fortifications at Assos are in many respects unique; and Mr. Clarke is probably right in believing that, as showing the consecutive development of masonry during the whole classical period, they will be henceforth the standard by which the date of all Hellenic walling of historical times will be determined.

IN the field of American archæology, the agents of the Institute have been busy, and the indefatigable explorer, Mr. Bandelier, whose interesting discoveries at the pueblo of Pecos are familiar to our readers, spent the spring and summer of 1882 in New Mexico, studying the dialects, customs and traditions of the sedentary Indians of that country, and comparing the manuscript records still accessible, with the purpose of unravelling a thread of history which has been almost hopelessly confused by the frequent migrations of the Indians, as well as by the profound modifications which Spanish and American influence have made in their national legends. In Mr. Bandelier's opinion, the numerous ruins of communal houses and villages which are scattered from Colorado to Southern Mexico do not by any means represent an aboriginal population large enough to occupy all the dwellings included in them. On the contrary, he believes that a single small tribe, moving, as circumstances required, from one place to another, and building its characteristic habitation in each, may have left permanent traces quite disproportionate in extent and importance to its own population; and he sees no reason for thinking that the number of inhabitants of the country at the time of the Spanish Conquest was more than twice as great as at present. Among the tribes themselves, small as they are, he has found many curious and significant customs, one of the most singular, perhaps, being that which regulates the position of the cacique, the head of the tribe among all the sedentary Indians. It seems that the cacique at present holds a nominal dignity rather suggestive of that of the Queen of England. Although treated with a deference almost superstitious, he has at ordinary seasons no duties whatever, and busies himself solely with his private affairs, the government of the tribe being administered wholly by the tribal council and the different executive officers. In times of internal commotion only he is called upon to exercise his authority, and on such occasions his word has something of the force of an inspired mandate, until peace is restored, and he sinks back again to his quiet avocations.

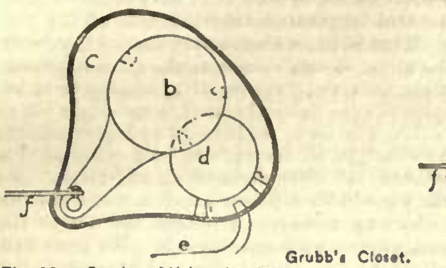
A CORRESPONDENT of *Le Génie Civile* gives an interesting account of the engineering operations which have been carried out on the ground at the site of the Panama Canal. It seems that all the preliminary work of selecting a route for the canal was done with the aid only of maps at a very small scale, enlarged for the purpose, and of course furnishing a very vague and approximate indication of the features of the country. Before any excavation could be begun, it was necessary to mark out on the ground the centre line of the great trench, and for this purpose a survey on the spot had to be made. Two methods of carrying out this pioneer survey presented themselves. One was to begin by selecting stations in different parts of the country bordering on the canal, and with the help of these prepare a new and corrected map, upon which the line of excavation could be plotted anew, to be followed out in the usual manner. This plan, which would be the simplest and best in an ordinary country, was a very difficult and laborious one in a tropical forest, where each station, together with the road to it, must be cut through a dense mass of vegetation, and the lamented engineer Blanchet, the agent for the contractors, Messrs. Couvreux and Hersent, proposed another plan of operations, the wisdom of which, although it was not adopted, has now been shown by experience. M. Blanchet's proposition was to accept provisionally the route laid down in the small and imperfect map, and to follow out this line upon the ground by a clearing through the forest four hundred feet wide, in which instruments of precision could then be readily used, and the definitive axis of the canal determined. According to M. Blanchet's judgment, the inaccuracies of the earlier maps were not so great that the practicable line would not be found somewhere within a clearing of this width, and there would be no loss of time in cutting away the forest at random in search of station-points.

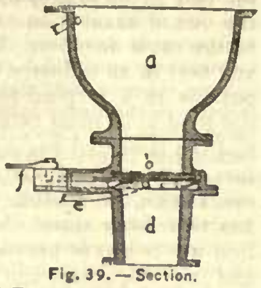
IN place of this system of working, a modified plan was determined upon, and the clearing, or *trocha*, proposed by M. Blanchet was reduced in width from four hundred feet to forty. In consequence of this reduction the comprehensive view of the ground passed over, which it was M. Blanchet's object to secure, was lost, and the engineers in charge, instead of pursuing a regular course, independent of minor considerations, were continually turned aside by obstructions of which they were unable, from their narrow pathway through the thick forest, to measure the extent, and the *trocha* became a crooked trail in which precise measurements could only be obtained with difficulty, while the determination of the exact route of the canal had still to be made by new struggles with the tropical vegetation, carried often to a considerable distance from the pioneer clearing. In point of fact, the narrow pathway, deviating from side to side, to avoid trifling obstacles, was finally abandoned, and the ultimate location of the canal was fixed by reference to the line of the Panama railroad while, as it turned out, the ultimate route agreed so nearly with the theoretical line that M. Blanchet's wide *trocha*, if it had been made, would have been almost everywhere included in the final clearing, and would have formed a part of it. In this way the labor expended on its foundation would have saved exactly as much labor of the same kind in making the final clearing, which is eight hundred feet wide, and all the advantages which it would have presented for the ready determination of the canal lines, for opening communication across the country, and for aërating and improving the scene of labor in the malarious forest, might have been enjoyed without any further expense; while the narrow path which took its place proved to be a costly mistake, nearly useless, even for the purpose it was intended to fulfil, and still more useless for any other.

ONE of the apartment-houses in the fashionable quarter of New York has just lost a tenant under circumstances which made it necessary to call in the aid of the law in effecting an adjustment between the parties in interest. Some time ago a young broker hired a suite of rooms in the house for a year, agreeing to pay his rent at the rate of one hundred and thirty-five dollars a month, in advance. Immediately after moving into his rooms his wife was taken sick, and soon after his servant, both of them remaining unwell for a long time. His physicians told him that his family was suffering from the effects of sewer-gas, which filled the rooms from the defective plumbing-work, and at length the Board of Health made inquiry into the condition of the premises, and ordered that the plumbing should be repaired within five days. The broker waited to see if this order was complied with, but it was not, and at the expiration of the five days he removed his family from the house. He had paid his rent regularly up to the time of his removal, and on the first day of the month after he left the house another bill was presented to him for the rent in advance for the month. This he refused to pay, and the owner brought suit to recover the money. Evidence was given by physicians and experts in plumbing, besides those members of the family who had suffered, and the jury promptly brought in a verdict for the defendant.

WATER-CLOSETS. — V.

GRUBB'S CLOSET. — In Grubb's closet and in the other two mentioned above, the only difference being in their details and





Grubb's Closet.

Fig. 38. — Section o' Valve-chamber. Fig. 39. — Section.

a, Bowl. *b*, Valve. *c*, Valve-compartment. *d*, Entrance to soil-pipe or trap. *e*, Supply-pipe to valve-chamber. *f*, Rod connecting with hand-pull. *i*, Springs.

in the manner of working the valves, is a disc that has a diameter a little greater than the opening in the soil-pipe. This disc is attached to one end of an arm, while at the other end is the pivot on which the valve rotates. The valve has springs to press it tightly against its seat, and a branch from the supply-pipe to wash off the valve and to wash out the valve-compartment. The supply-valve is worked by the same pull that rotates or slides the valve.

Wilkins's Closets. — There was a curious sliding or turning valve closet invented in England in 1846 by one J. W. Wilkins. The re-

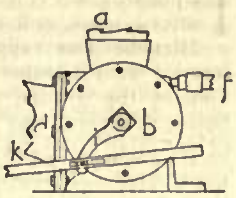


Fig. 40. — Section. Fig. 41. — Side view.

Wilkins's Closet.

a, Bowl. *b*, Receiver. *d*, Trap. *e*, Vent-pipe. *f*, Supply to valve. *i*, Crank. *k*, Lever connected with pull-rod.

ceiver was a cylindrical box in which worked a cylindrical valve, a section only being solid. This solid part of the valve was kept in position by a weighted lever, so as to form a bottom for the bowl of the closet; when the lever was raised, it turned the solid part of the valve away from the bottom of the bowl, dropping its contents into the receiver. In connection with this closet I find for the first time a vent-pipe connected with the crown of the trap. The specifications claim it as a novelty.

Norton's Closet. — The two following closets, which work on the same principle as the Wilkins, were invented in the United States in 1876 and 1882 respectively. Norton in his invention applied the principle of a ground-cock to the valve of a water-closet. The valve is simply a piece of conical metal with a hole the same diameter as the soil-pipe, which, when turned so that they will be concentric, will allow the waste matter in the bowl to pass into the soil-pipe. The valve is kept in position by the aid of a weight and spring, as is shown in the cut.

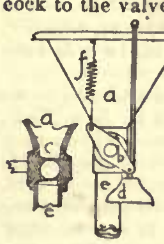


Fig. 42.

Norton's Closet.

a, Bowl. *b*, Crank. *c*, Valve. *d*, Weight. *e*, Soil-pipe. *f*. Spring.

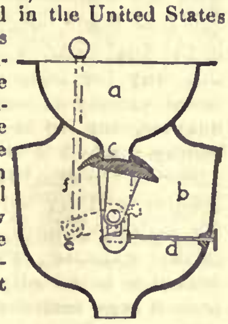


Fig. 43.

Daggett's Closet.

a, Bowl. *b*, Receiver. *c*, Valve. *d*, Set-screw. *e*, Crank. *f*, Pull-rod.

Daggett's Closet. — Daggett's closet in the action of the valve is almost identical with the one invented by Wilkins. The valve is a segment of a cylinder that revolves on its axis. This valve is operated by means of a crank attached to the hand-pull. When the valve has revolved to a certain distance, it leaves the orifice at the bottom of the bowl open.

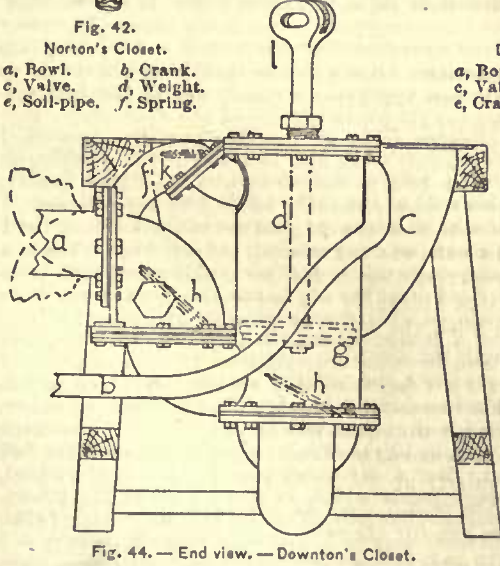


Fig. 44. — End view. — Downton's Closet.

a, Discharge-pipe. *b*, Supply-pipe. *c*, Bowl. *d*, Cylinder. *f*. Vent-pipe. *g*, Piston. *l*, Place for handle. *h*. Upward valve. *i*, Hand-hole. *k*, Vent-pipe.

This closet has a screw with the handle on the outside of the receiver, so the valve may be made to press more firmly against its seat if it should become loose.

Sliding-valve closets seem to have been in actual use to a very limited extent, the reason probably being that the inventors or manufacturers found that they would not work in practice, it not being practicable to make the valve slide when and where the operator desired. It would be almost impossible to adjust the parts so they would have a water-tight joint for any length of time. The hinged-valve closets are generally simpler in their construction, and a tight joint with this form of valve is more practicable, and there are a large number of this type of valve-closets in use at the present day in all parts of the world.

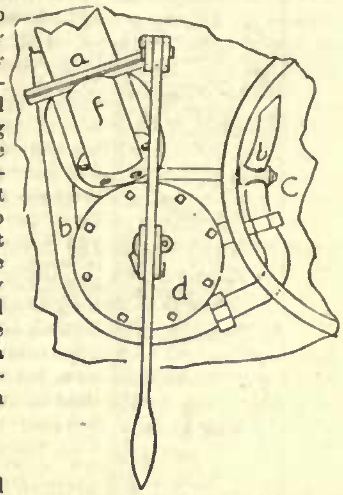
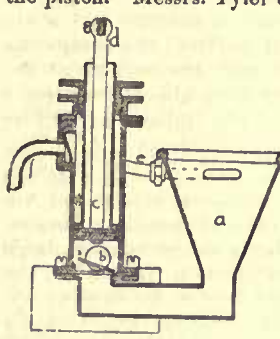


Fig. 45.— Partial view of top.— Downtons' Closet.

HINGED-VALVE CLOSETS.

Among closets that have hinged valves, or valves working on a spindle, I find one type in which the valve opens upward, another outward, and another downward in a direction relative to the bowl of the closet.

Downton's Closet. — Taking under consideration first the closets in which the valves open upward or toward the bowl, I find the first invention of this type was made in Great Britain in 1825, by J. Downton for what he calls a "pump-closet." In this closet the matter in the bowl is drawn by the upward action of the piston into a cylinder, where it is retained by a valve that opens only in an upward direction. When the piston is pressed down by a handle, the fæcal and other matter is discharged in any direction that may be desired. The return to the cylinder of the matter discharged is prevented by a flap-valve opening only in an upward direction. To enable the piston to work easily, the cylinder has an air-inlet near the top. The supply-valve is connected with the handle that works the piston. Messrs. Tylor & Son, of Newgate Street, London, manufacture Downton's closet at the present day, with what they consider an improved form of lever-handle, "which



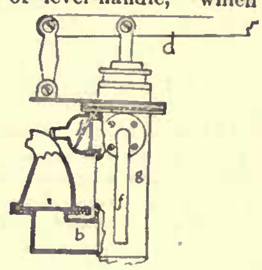


Fig. 46. — Section. Sands's Closet.1 Fig. 47.

a, Bowl. *b*, Discharge-pipe. *c*, Piston. *d*. Lever. *e*, Supply. *f*, Air-pipe. *g*, Cylinder. *i*, Valves.

works the double-action pump and water-tap at one action. . . . It is equally effective above or below the water-line."

Sands's Closet. — In the United States, in 1874, one Sands invented a closet of this type that is very similar to Downton's. This device is also intended to be placed below the water-line or the point of discharge. By raising a lever, the excrementitious matter in the bowl is drawn by the suction of a piston directly into a cylinder. When the lever is pressed down, the waste matter may be discharged in any direction required, through the soil-pipe previously placed in the proper position. The flap-valves, of which there are two, opening in an upward direction, prevent the return of the waste matter to either the bowl or the cistern.

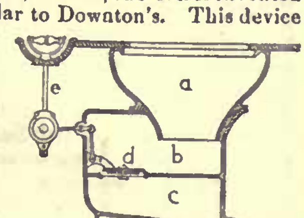


Fig. 48. — Blackwood's Closet.

a, Bowl. *b*, First receiver. *c*, Second receiver. *d*, Valve. *e*, Hand-pull.

Blackwood's Closet. — I note, as the only instance of this type of closet being intended for general use, one invented in this country by W. Blackwood in 1881. In this closet the matter which drops into the bowl would go directly into a large compartment or receiver. The valve is opened upwards by means of a combination of levers connected with the hand-pull. When the valve is raised, the water and excreta would find their way into a second receiver. The first compartment, which opens directly into the room through the bowl, would without doubt get and remain in a very filthy condition.

PROPOSED EXPLORATIONS AT SARDIS. — Mr. Dennis, the British antiquarian, has bought the site of the temple of Cybele at Sardis, Asia Minor, and great hopes are entertained of the discoveries among the ruins.

PICTURES OF THE SEASON IN NEW YORK. — II.

THE dealers' importations have, it seems to me, not been quite so interesting this year as they were last season; yet they have included many pictures most worthy of attention. The decline has been rather in the matter of quantity than in that of quality. Perhaps the general commercial depression has had much to do with limiting the dealers' enterprise. Certainly they all complain a little of the dulness of their trade as compared with recent years, and it is well known that the picture-market is more susceptible to the effects of even slight fluctuations in the commercial world than is any other. The earlier winter exhibitions showed good receipts, but the pictures sold were mostly small and inexpensive, producing large sums in the aggregate, but making moderate inroads upon individual purses. The demand for expensive foreign works has been small, and the sales at our current Water-Color Exhibition seem likely to fall below anticipation.

One of the finest importations of the year has been a beautiful early Troyon, brought over by Mr. Avery. It was a landscape with figures — a view from the terrace at St. Cloud, with Paris and the wide Seine valley and the river in the distance — a beautiful work alike in color, in handling, in composition and in sentiment, and possessed, moreover, of a certain extrinsic interest from the fact that the view was taken from the garden of Troyon's mother, and the group of little figures in the foreground included Troyon himself, Van Marcke, and Troyon's little daughter, afterwards to be Van Marcke's wife.

The chief attractions at Mr. Schaus's have been another fine Troyon, also a comparatively early work, with cattle in a flat landscape near a row of pollard willows; and two superb specimens of Rousseau, both well-known pictures formerly in the Laurent-Richard collection. One was a soft, spring-like river-view, the other a deep-hued sunset, with large, dark trees in the foreground, each admirable, and both together giving interesting evidence of the great master's versatility. To be seen in the same gallery was a small Fromentin, which seemed to me the finest I had ever met with in this country. It was called "*La Halte des Muletiers*," and was also a famous picture, formerly owned by M. Lepel-Cointet. Painted toward the end of Fromentin's life, when he had gained a more solid technical skill with which to incarnate his always fresh and genuine sentiment, when he had outgrown the influence of Marilhat and learned all that Corot could teach, it was indeed a perfect work. The groups of Arabs and animals in the foreground were done as Fromentin alone could do them, and the masses of delicate foliage and the lovely sky were worthy of Corot in his happiest mood. At Goupil's there was also a Fromentin to be seen, an earlier work, showing a caravan on the march, interesting of course, but far less perfect than the other, with far less of light and atmosphere, though with as much of color. At the last-named gallery were, moreover, two good Detailles: one in oil, the other a large elaborate water-color, depicting the review of a French army corps. A large picture by Knaus, showing a fight among peasants in a dancing-hall, proved that he does well to restrict himself more commonly to simple pastoral or humorous subjects. It was utterly devoid of dramatic power, badly grouped, dull in color, a little hard in handling, and the faces most unsuccessful as character studies.

The Messrs. Reichard have had at their rooms an important picture by Hébert: an ideal figure called "*La Voix céleste*," not very interesting to those who care for reality in art, but an extremely good work of its kind, morbid and rather lachrymose in sentiment, but giving evidence that the sentiment had been genuine on the artist's part and not affected. If there is one really belated mediæval dreamer in our modern world it is surely Hébert, and his art has a value, from its sincerity as well as from its technical qualities, far above the art of theatrical sensationalists like Gabriel Max. The same firm showed also some good small pictures by the younger school of Munich artists, especially strong in character, and a number of very nice canvases of home production. Mr. Wordsworth Thompson, Mr. Bruce Crane, and Mr. Bolton Jones were among those who seemed to have profited most by their summer's holiday.

Of course there have been everywhere showy, popular, clever but tiresome pictures to be seen: Benjamin Constants, Moreaus, Beckers, and a host from other hands. But one fine work of the most recent and most realistic school should not be forgotten. This, imported by Mr. Schaus, was a picture by Dagnan-Bouveret, exhibited at the *Salon* a year or two ago, and called "An Accident." It showed a small peasant who had injured his hand and was having it bound up by the young village doctor, while a group of more or less sympathetic elders watched the operation. Fine in composition, low in tone yet good in color, and extremely strong in handling, the chief merit of this remarkable canvas was yet in its rendering of character. Such *genre* painting as this is very far from being literary in its interest. We need no description, no title to make us perceive all the painter's intentions, to take us at once into the presence of the actual scene. One felt that the characters of all the personages present — from the pale, half-fainting, yet plucky boy, with his trusting eyes fixed on the doctor's face, to the anxious grandmother, the men with their different degrees of sympathy or indifference, or the doctor himself, seen from the back with only a bit of his cheek and his clever hands in view, yet instinct with professional enthusiasm in every line — might be interpreted by a study of this canvas as well as by a study of their actual flesh and blood. No one, I think, but Munkácsy could have painted such a scene in quite so artistic, strong, and speaking a way, and indeed the art of the younger painter has much affinity with Munkácsy's. We have had no Munkácsys imported for us this year as far as I have seen, but this canvas of Dagnan-Bouveret's must have gone far to console his admirers for the fact.

Mr. Cottier has in his rooms some most beautiful works, many of them recently imported; indeed, here more than anywhere else in New York, one is sure of seeing the best the city has to show. But his most recent acquisitions have not yet been publicly shown, so a notice of them must be deferred to another day.

The Boston Artists' Exhibition was not a pecuniary success, I hear. The opening of the ever-popular Water-Color Society had doubtless something to do with the matter, but still more of the general lack of interest is to be attributed to the nature of the collection itself; not that it was not good. Opinions differed, of course, as to its excellence; but no one denied it many very strong points, and to some of us it appeared much the best small exhibition we had seen for many a year. But it was not popular in its nature. There was too little variety, too few pictures — hardly one, in fact, of the slight, anecdotal, familiar sort that always please the crowd. Only twenty artists were represented, and as these almost all belonged to what we may, by a little stretch of terms, call a single school, there was a certain uniformity in the collection as a whole. With scarcely a single exception the pictures were all portraits and landscapes. Mr. Fuller's "Dandelion Girl" was a somewhat ideal figure, yet did not depart very widely from the domain of portraiture. There was some discussion as to whether the art of Boston was really well represented by the exhibition. Of course some names were missing, but few, I think, of great importance — none whose presence would have given New Yorkers cause to alter materially the estimate of Boston work they formed in the presence of the actual collection. If Mr. Crowninshield had been represented, there would have been little opening for regret.

Mr. Fuller's pictures were, of course, the chief feature of the collection, not only in themselves, but in the evidence which surrounded them that they had influenced some of his younger fellow-workers. The very originality and individuality of Mr. Fuller's style, revealing as it does a peculiarly intense and personal sentiment behind his brush, make it one that cannot be too affectionately studied without great risk. The student is apt to mistake effects for causes, and to fancy that when he comes near to Mr. Fuller's manner, which is, however, but the natural expression of his thought, he will have secured much of the substance of his art.

Mrs. Whitman's large portrait of a child in brown seemed to me more beautiful than anything she had yet exhibited in New York; as strong, as bold, as fine in color, and as absolutely alive as her other works, while more refined in handling and more pleasing in effect. Surely there is no one in New York to rank above Mrs. Whitman in her especial branch. Mr. Vinton's two portraits, one several years earlier than the other, showed that, to say the least, he had not advanced in recent years — too much success, too many patrons, perhaps, and a resultant haste in method, or hardening into set manners of treatment. It is a pity he should not always do as well as in the "Thomas Appleton," certainly one of the best portraits our newer art has yet produced.

Among the landscapes, those of Mr. Appleton Brown were, I think, the finest; extremely fresh and individual, and satisfying in their frank, rich color-scale, as compared with the duller, grayer, lower or paler tones more commonly affected by our painters. I have no space to note what else of good the exhibition held, but I must add that to me and to many others it proved, when taken as a whole, an interesting fact: this is the fact that Boston artists are a quite independent band; that the city has an artistic existence of its own, and has developed, in landscape painting at least, what may properly be called a Boston school. Mr. Brown, Mr. Cole, and their younger fellows have no near relations in our own group of landscape painters; nor do I think they are much indebted to foreign example. They seem to me as original as they are attractive. Mr. Fuller, of course, has no parallel with us; but then he has none in Boston, either, and, as I have said, if he begets imitators, the fact will not be hopeful. But a city which can send us one Mr. Fuller, a school of landscape painters such as that headed by Mr. Brown, and two portrait-painters like Mrs. Whitman and Mr. Vinton (when the latter is at his best), may be looked upon with a little envy and with no little admiration by the metropolis itself. Of course there have been critics to say that the Boston band is narrow-minded, is not versatile, is a clique, in short; but perhaps for this very reason its products seemed to me so individual and so impressive. If the work ran a good deal in one, or more properly in two veins, they

were both good ones, and those who would not enjoy them because they were not more numerous, hardly deserve, perhaps, to have their strictures here put on record.

The New York Art Club, an association of some years' standing, but which has never been publicly prominent before, holds this year the first of what it means to make, I suppose, a series of annual exhibitions. The collection is limited to the work of members, but not to novelties. As the members are a rather miscellaneous lot, and as some of them have sent rather inferior pictures, the show is by no means homogeneous; yet it contains some features of the greatest interest. Mr. George Inness's large, misty "Sunset in the Adirondacks" had been shown before, but, recently repainted, reappeared in even more than its former beauty and impressiveness. Mr. Dewey sent a capital picture of a low, sandy Long Island shore, prosaic in theme and simply true in treatment, yet not devoid of personal sentiment. Mr. Shirlaw contributed some studies in color, charming in this respect, but deficient in their suggestion of textures. Mr. Ryder was at his best in a beautiful little twilight landscape with three figures. Mr. Eastman Johnson sent a poor *genre* picture of a child and a red-hot stove, and had inserted in a landscape by Mr. McEntee the portraits of two little children, most modern as to costume, but evidently intended to suggest the classical "Babes in the Wood." It seemed hardly necessary that two well-known artists need have co-operated to make so poor a canvas. Mr. Bunce, Mr. Crane, Mr. Bolton Jones, Mr. Chase, Mr. Edgar Ward, Mr. Shurtleff, and Mr. Miller were among the other painters represented. Mr. Alden Weir sent a charming girl's portrait, first exhibited last spring. With Mr. George Inness, Jr., we marked an immense improvement in technical skill. He suggested his father in certain portions of his work, but preserved in others a strong accent of individuality. His picture was more interesting than beautiful, however. We believe — all of us, I hope — that if American art is really to flourish, it must as a general thing treat distinctively American themes. We were glad, therefore, to see Mr. Inness, Jr., giving in his adherence to this theory, but wondered a little at his thorough-going pluck when we saw just what his American subject was: a broad, rough pasture with cattle, slim, stiff little yellow maple trees, and a farmer's boy in the foreground; beyond these a road with a pair of trotters driven to a buggy by a gentleman in a tall hat; beyond, again, a newly-planted suburban lot, and a square white house with the greenest of Venetian shutters and the reddest of window-blinds; and in the distance a range of low, mist-covered hills, most beautifully painted. There had not been the least attempt at beautifying, even at composing as unpromising a subject as even a New Jersey suburb could afford. Mr. Inness had not exactly made a picture, but his canvas was yet far more interesting than most of its conventionally pretty contemporaries. It took not only pluck to attempt such a theme but a great deal of good painting to make as much of it as Mr. Inness accomplished.

But the great feature of the Art Club's exhibition — a feature which put it far above the rank of most shows of its kind — was the reappearance of Mr. La Farge after several years of seclusion — in so far as painting is concerned — from the public eye. No one of his four contributions was new, and three had been exhibited, I think, before; but all were splendid pieces of work and one the finest thing in its way that I remember ever to have seen from an American brush. A large portrait of a boy and a greyhound was a little awkward, perhaps, in composition, but extremely true and strong in sentiment, solidly painted and rich in color. Two single figures of St. John and the Madonna respectively, were planned to flank a representation of the Crucifixion which, however, has never been accomplished. Intended for an altar-piece they were more broadly painted, more vague in effect than the portrait — a little morbid in sentiment, it may be, but extremely powerful both in sentiment and execution. With less immediately apparent superficial cleverness than some of his younger brethren, Mr. La Farge has a touch of greatness, a touch of genius, both in the way he feels and in the way he executes that puts him above the level of any rival. And I need not limit myself to our own school alone when I speak of the fourth and most beautiful of these pictures. I may compare it with similar work from the best foreign brushes and say with confidence that there is no man living who could do a more subtile, beautiful and original piece of work in the way of flesh-painting than Mr. La Farge here did for us — not recently, but some thirteen years ago, for though the picture was now exhibited for the first time it was dated in 1870. It was a small canvas with the figure of a scarcely-draped girl sitting on a green bank under an apple tree in blossom. It was little more than a study of a nude figure — the face rosy and placid, with a slight dreaminess of expression, not strong enough to mark it decidedly into any ideal category, but suggestive enough to inspire the spectator, perhaps, with some corresponding fancy of his own. The flesh-painting of the figure was simply perfect — exquisite in color, wonderful in modelling, firm, solid, substantial as nature itself, yet handled with delicacy and with extreme originality as well as strength. A single knee cut out from this wonderful canvas would be worth acres of such flesh-painting as we see on ordinary exhibition-walls, I care not in what land we look. The landscape element was charmingly treated, especially as to color. The head was less successful, having seemingly been of less interest to the artist — was not so beautiful in treatment and not so perfect in color. But a far greater number of blemishes than any eye could find in this picture would not, set against its wonderful merits, make it anything less than a truly marvellous piece of painter's work — not only "clever" but stamped with the signet of genius itself.

The Water-Color Exhibition deserves, of course, a notice all to itself. I will conclude by going back for a moment to the dealers' latest importations and mentioning two pictures brought from the recent Paris *Salon* which were striking examples of the perfection to which mere technical skill has arrived in France. One, imported by the Messrs Reichard, was the "*Frou-Frou*" of Clairin, a life-size figure of a girl in a gorgeously elaborate fancy costume, chiefly in tones of white. The strength, rapidity, facility and expressiveness of touch put into the rendering of the fluffy stuffs was something wonderful to see. The flesh-painting was good as well, chiefly done with the palette knife. The other picture, not dissimilar in kind, was "*L'étoile*" of Commere, shown at Goupil's. It represented a ballet girl seated with her filmy skirts thrown up behind her head. Here white was again predominant, contrasting only with the pink of the flesh tones and the *tricots*. The technique was even more surprising than in Clairin's picture, applied to the rendering of soft, broad masses, not of glittering foam-like effects. Many an artist picked it out last summer as the most consummate specimen of mere technique in the Paris exhibition, and though one regrets that such skill should be expended on a subject without more vital interest, it should in justice be added that there was not in this canvas any trace of the vulgar spirit in which French painters so often approach their models — even when their models are of a kind that do not so readily lend themselves to vulgarity as one might imagine a ballet girl would do. This figure was anything but vulgar, either in type or in feeling, the face indeed, being extremely sweet and attractive, scarcely even suggesting the meretriciousness of the stage.

M. G. VAN RENSSELAER.

THE RUINS OF PERSEPOLIS.

LITTLE more than a stone's throw from the telegraph wires which convey commands from Downing Street to the Viceroy of India stand the ruins of Persepolis, the Summer Palace of the Great King. In these days of archæological surveys and scientific expeditions, despatched to the four quarters of the globe at the expense of enlightened governments and learned societies, it is certainly astonishing that no systematic investigation has ever yet been undertaken of the great artificial platform on which stood the halls and palaces of Darius and his successors. Great sums have at various times been wastefully expended on Persepolis. A moiety of what was disbursed by the French Government in the production of the luxurious folios of Messrs. Flandrin and Coste's "*Voyage en Perse*," if judiciously expended on the spot, might have enabled those artists to get the earth and rubbish cleared off the platform under their personal superintendence; and, to cite but one point, the curious system of drains ramifying through this Cyclopean masonry, and of which no outlet has ever yet been found, might then have been thoroughly explored. Judging from the immense quantities of archæological and artistic treasures which the mud of the Cloaca Maxima has preserved to us intact from the times of the Tarquins, we might well hope that in the silt of the drain which pierces the foundations of the Hall of Xerxes there might yet be found personal ornaments and household utensils which had belonged to those who attended the court of the Great King. In the plans of Persepolis hitherto published these drains have always been very incorrectly marked. Their number is very considerable, and they ramify through the whole structure of the platform in almost every direction; and, but that they are now for the most part choked up with débris, they would seem to allow of underground communication between the various palaces. Such was probably the intention of the builder, for the passage of the drain was originally high enough to enable a man to pass through without stooping; at present, however, the inquisitive traveller has to crawl about on hands and knees; and, to say nothing of the discomfort and the dirt, runs grave risk of disturbing the siesta of some stray panther. or, perchance, even a lion-whelp, these cool retreats being a favorite lair with the wild beasts from the neighboring hills. There is a particularly large species of viper, too, which infests the dark holes and corners of the masonry; its body attains the thickness of a man's arm, and its bite is said by the natives to cause instant death. It is perhaps curious that nothing should be positively known of the manner in which the ruin of Persepolis was brought about. The Greek historians relate how Alexander the Great in a moment of drunken frenzy, and instigated, it is said, by Thais, fired with his own hand the palace of the Persian monarch. Subsequent writers, however, have altogether disbelieved the story, and have referred the ruin of Persepolis to the epoch of the Mohammedan conquest. Against this last view it may be urged that no account is to be found in the Moslem historians of any destruction of these palaces having taken place at the time of the conquest; and, bearing in mind that many of the early annalists and geographers in Islam were converted Persians, we should certainly have had some account of the matter had the devastation of what they held to be the throne of Jamshid been an event of the days of their grandfathers, and the work of the iconoclastic Arab. As tending to

confirm the Greek tradition of the destruction having been caused by fire, the traveller may still observe the mark of flames on the doorways and broken pillars of the edifice known as the Hall of Hundred Columns. A curious indication of the material used for the roof of this hall is to be obtained from the pieces of charcoal and charred wood which form a layer extending apparently over the whole floor of the building. At the present day the area of the hall is covered to the depth of some ten feet by hardened mud and rubbish, mostly detritus brought down by the winter rains from the hill at the foot of which the palace stands; but digging, which has been undertaken to ascertain the position and number of the columns, has everywhere brought to light a stratum of mud containing bits of charcoal, this stratum being some twelve inches in thickness, and lying within an inch or so of the marble blocks forming the floor of the hall. This charcoal we may take to be the remains of beams and interior fittings brought down at the falling in of the roof. Examination under the microscope shows that the wood of which we have here the charred remains came from a tree of the pine family, and from the markings of the grain still visible in the charcoal, even after a lapse of 2,000 years, the species may be identified as that of the cedar. Now conifers do not grow in any of the regions round Persepolis; the nearest cedars are those of the Lebanon; and though there is no documentary evidence on the subject, we may with some probability regard this as the spot whence came the beams for roofing the Hall of Hundred Columns, if we call to mind the analogous circumstances at Nineveh, where cedar charcoal has also been found, and where clay tablets are extant, bearing edicts in cuneiform writing relating to the transport of this timber from the coast of the Mediterranean overland to the valley of the Tigris.

The ruins of the Persepolitan palaces have a strange skeleton-like appearance, very striking on coming for the first time up the gigantic stairway from the plain onto the platform. Of each edifice the framework, so to speak, still stands, but of walls nothing remains. The buildings were but one story high. Doorways and windows, with here and there columns crowned by the quaint double-griffin capitals, stand out sharp against the blue sky, appearing in many cases almost as freshly carved as in the days of Alexander the Great. These are all of the black marble quarried in the neighboring mountains; the walls of the buildings, on the other hand, would seem to have been built of sun-dried brick, for of these absolutely no vestige remains. The black doorways and window-frames of the palace of Darius will remind the traveller most strangely of the "wings" of a theatre. He may walk out of a door and return through the space intervening between it and the neighboring window. The original walls were so thick that the sculptured slabs of marble lining the exits are often a couple of yards broad, and these, viewed from the end of the hall with the figures in bas-relief standing out life-size from the polished surfaces, certainly intensify the stage-like effect so incongruous in these chambers of the Great King.—*Saturday Review.*

ON THE USE OF BUILDING STONES.[1]—I.

IN the paper I had the privilege of bringing before the Association last winter, I pointed out the characteristics of good building stones, and the principal quarries in Scotland from which such could be got. I stated that what the architect had to look for was a stone that was durable, strong, and of a color which would best bring out the architectural features of his design and harmonize with the locality and surroundings in which it was placed. We have, fortunately, within very easy reach, abundance of stone comprising these qualities; but, however good or beautiful it may be, if wrongly used disappointment and failure are sure to be the result.

The laws observed in regulating the elements and forces in Nature are thoroughly geometric, and the same laws are equally binding on the architect and his works. The constructive lines on which Nature proceeds never fail, when free from debasing influences, to secure what we call beautiful in form, color or usefulness; and the same lines cannot be too closely followed by the architect or builder who desires to reach excellence in an art which is noble in the highest sense of that word.

I know that it is held by many that the architect or artist is only trammelled in his conceptions by working on geometric lines. Some men, no doubt, have an intuitive perception of what is symmetrical and beautiful either as to form or color, just as there are those who, without the aid of gamut or scale, have an inborn knowledge of what is harmonious in music; but I hold that in architecture, as applied to the true styles, a geometric basis is at the root of what we admire in the examples we have of these; and that, if a new style of architecture is to be developed, we must fall back on what guided the old designers in their original conceptions of what was not only true to its use, true in construction, true in symmetry, but beautiful as well, because it *was true*—the cube, the circle, and its geometrical development giving that which we admire and call Classic, while the circle and the equilateral triangle supply the key to those noble Gothic structures which were erected five hundred years ago.

[1] A Paper read at a meeting of the Edinburgh Architectural Association on the 17th inst.

Before I enter upon the consideration of the uses of stone, I wish in a sentence or two to notice the use of timber and iron as constructive materials. There is a true way of using these, just as there is a true way of using other building materials, such as stone; but a serious mistake will be made by the architect or engineer if they attempt to use these on the same lines or for purposes which by their nature they are not at all applicable. As to the first, the designer who understands what timber as a constructive material can do would never think of using it for the purposes of an arch; especially one which has to meet the strain of a vertical and moving load. Yet this has been done on some of our most important railways in the construction of bridges and viaducts. Neither should iron be used for purposes which stone or other material is only fit for. To build a structure on constructive lines which admit of play or movement when the weight and thrust of a railway train or moving force comes against it, or upon it, is certain in time to be fatal. Hence the care that should be taken whether with stone, wood, or iron, to adopt a system of construction which will not only meet the nature of such material, but the work it has to do.

To unite wood and iron, where their opposite properties can never harmonize and work together, is sure to fail in the long run, as, under a strain or load, timber, from its greater elasticity, will yield to the pressure, but again recover its normal condition after the strain or load is removed. Iron, on the other hand, will keep the set it gets, and if united to the timber, is certain to drag it down to the weakness which is inherent to such a combination of material.

What I have said about wood and iron is rather aside to my paper, except in illustration of what I consider so nearly allied to the use of stone that I trust the Association will overlook the digression. The right use of stone is my subject, and I will endeavor to keep as close to my text as possible, giving in a practical way the results of my own experience, and what I have learned from others. To be in order I will consider:—

1. How to secure a foundation upon which the structure can be safely built.
2. How to place stone in the building so as to secure the greatest strength and durability.
3. How to use stone in the laying of a good foundation.
4. How to use stone in the building of retaining-walls.
5. How to use stone in the building of rubble.
6. How to use stone in the superstructure.
7. How to use stone for coursed work.
8. How to use stone for ashlar work.
9. How to dress stone so as to get the most durable surface.

1. *How to secure a Foundation upon which the Structure can be safely built.*

The foundation of a building is of primary importance, as, unless it is secure, the permanency of the structure cannot be maintained, however well built it may be.

Before laying a stone, the architect or engineer should be satisfied that the strata will give equal resistance to the pressure that may be put upon them.

Strata that are hard and soft are very dangerous. Even clay if mixed with boulders (which often happens) cannot be depended upon, unless they are removed, and means taken to equalize the ground on which the buildings are to be erected.

Next to rock, no better foundation can be got than sand or gravel when dry. If wet, means should be taken to drain away the water; but, if this cannot be done, large, flat-bedded foundation-stones of sufficient area, fairly dressed in beds and joints, and well put together, will, as the load increases, secure a foundation that anything can be built upon.

In my own experience I have often tested this, and particularly when building a bridge on a railway contract I had many years ago. This was an under bridge of considerable span, the girders being in the form of an arch, in segments of cast-iron, the security of which depended greatly on the permanent resistance of the abutments, or the bolts which held these segments together at their joints. In digging for a foundation, it was found that the strata were very soft, being layers of sand and moss alternately, and to prevent failure I took the precaution to strengthen the foundation of the first abutment by driving piles to a depth of thirty to forty feet, with horizontal planking, on which the foundation-stones were bedded. Before building the second abutment, acting on the advice of a railway contractor who had had more experience than myself, I adopted a different plan, viz., to dig out the soft material to such a depth and area as secured an outward resistance to meet the pressure of the large-sized stones that were afterward put into the foundation, course after course, until the load pressed out the water, and so secured a foundation which was equally as strong, if not stronger, than the first.

Where the strata are unequal or not to be depended upon, I know of nothing better than a good bed of concrete, certainly not less than three feet thick, and no architect should neglect this where there is the slightest doubt as to the sustaining character of the ground. This is always necessary in erections of different heights, and is particularly required in churches and other buildings where the spire, tower, or other elevation bears more heavily on the foundation than the walls which abut upon them. And, in addition to this, and to

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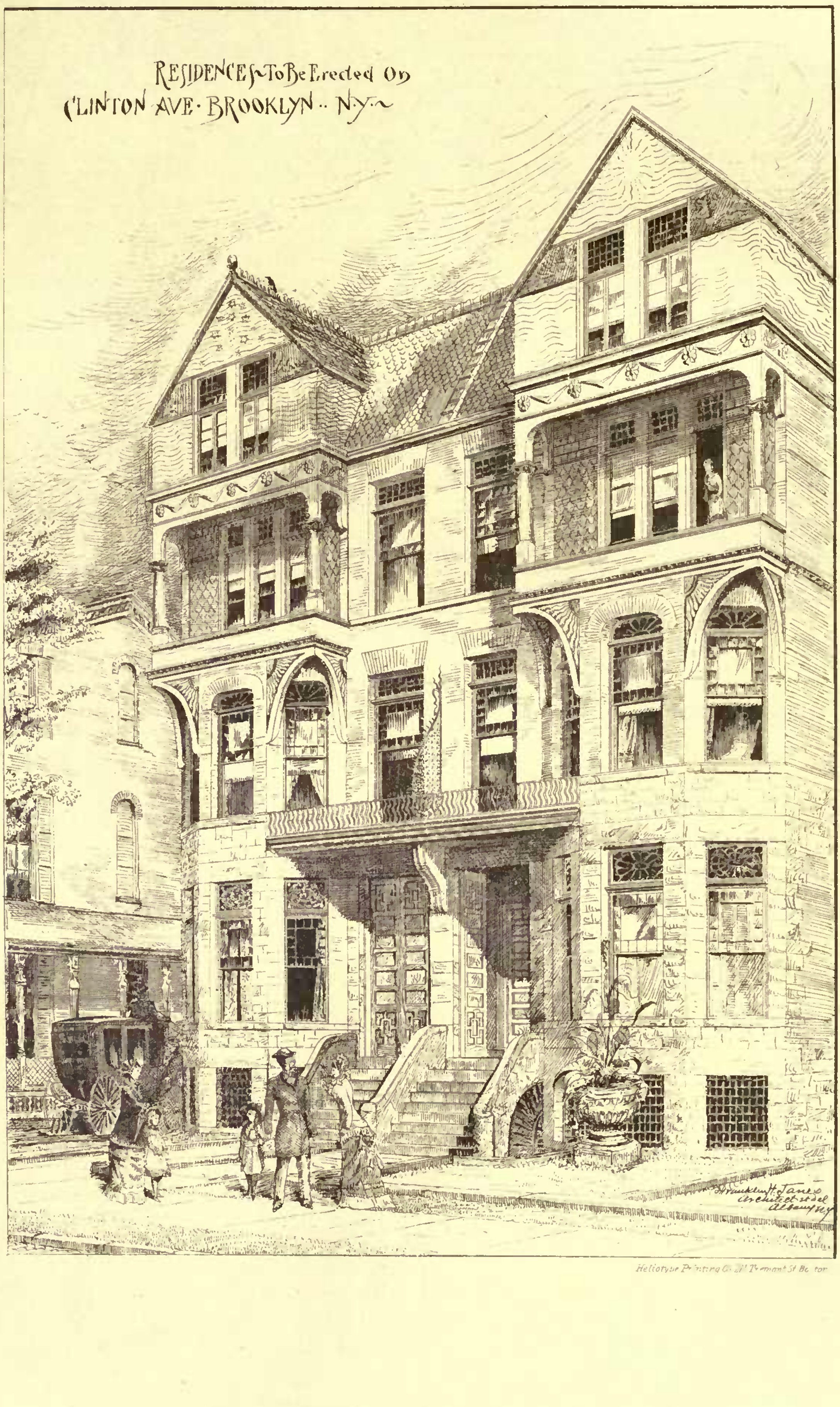

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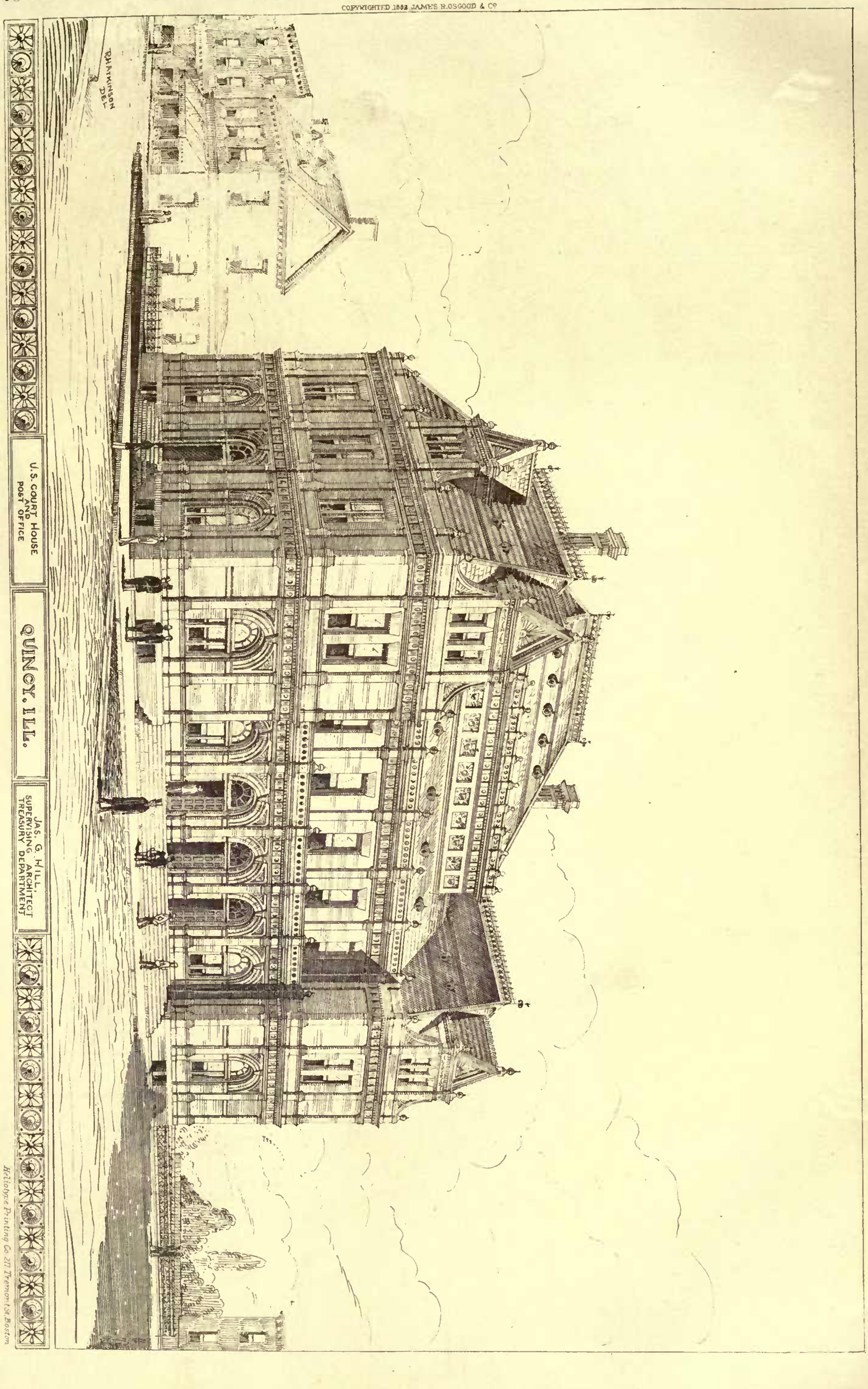

AMERICAN ARCHITECT AND BUILDING NEWS. MAR 10. 1883. No 376

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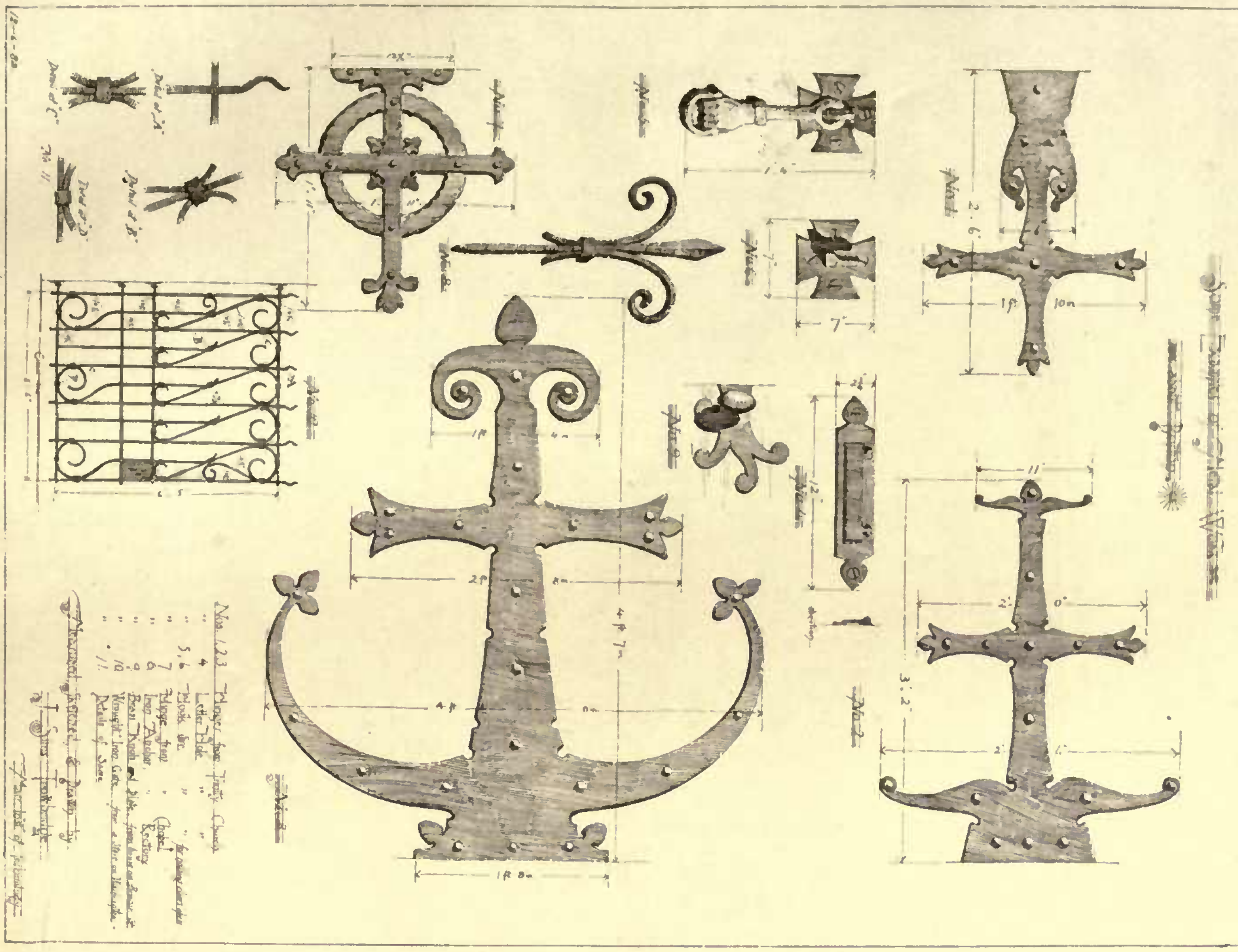

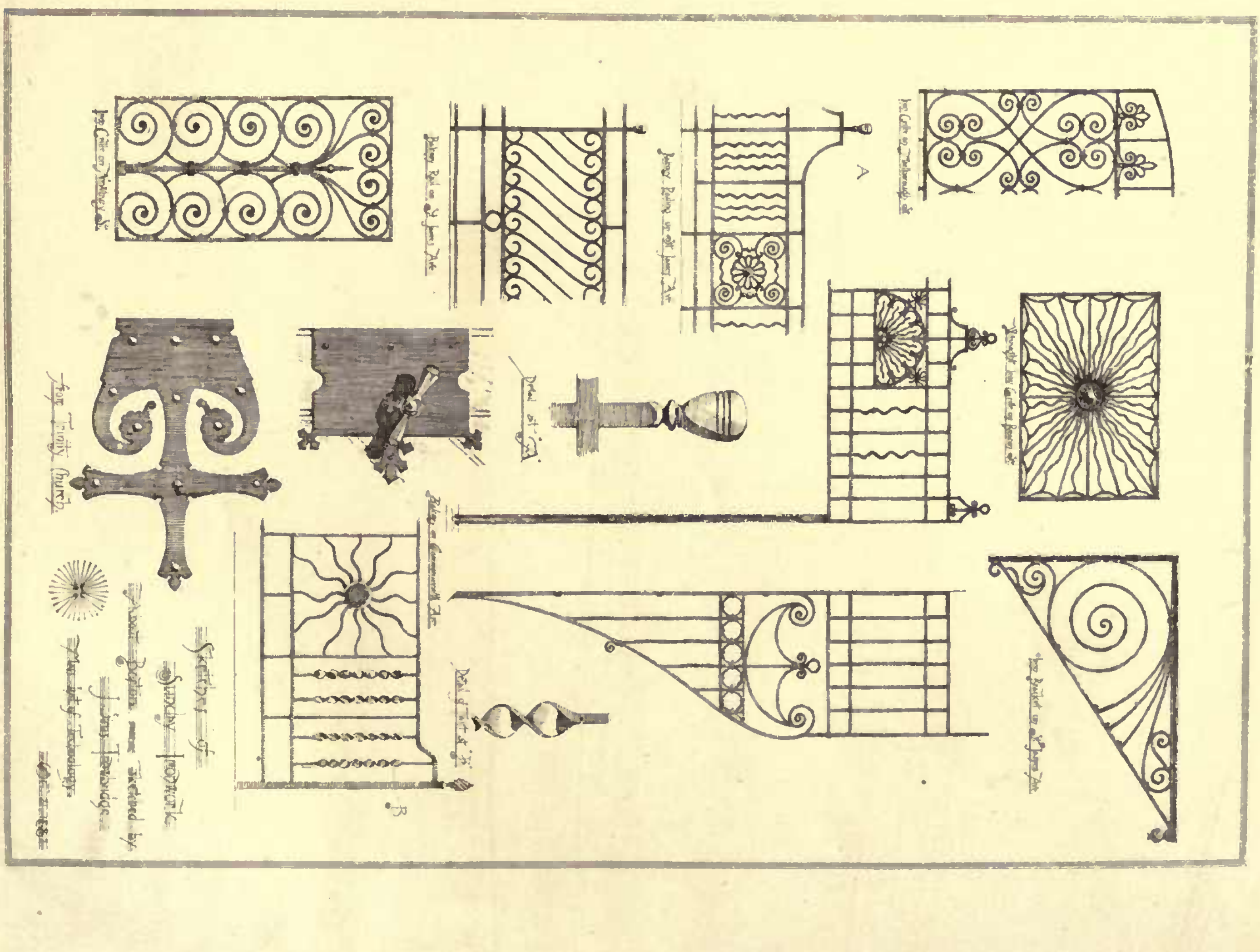

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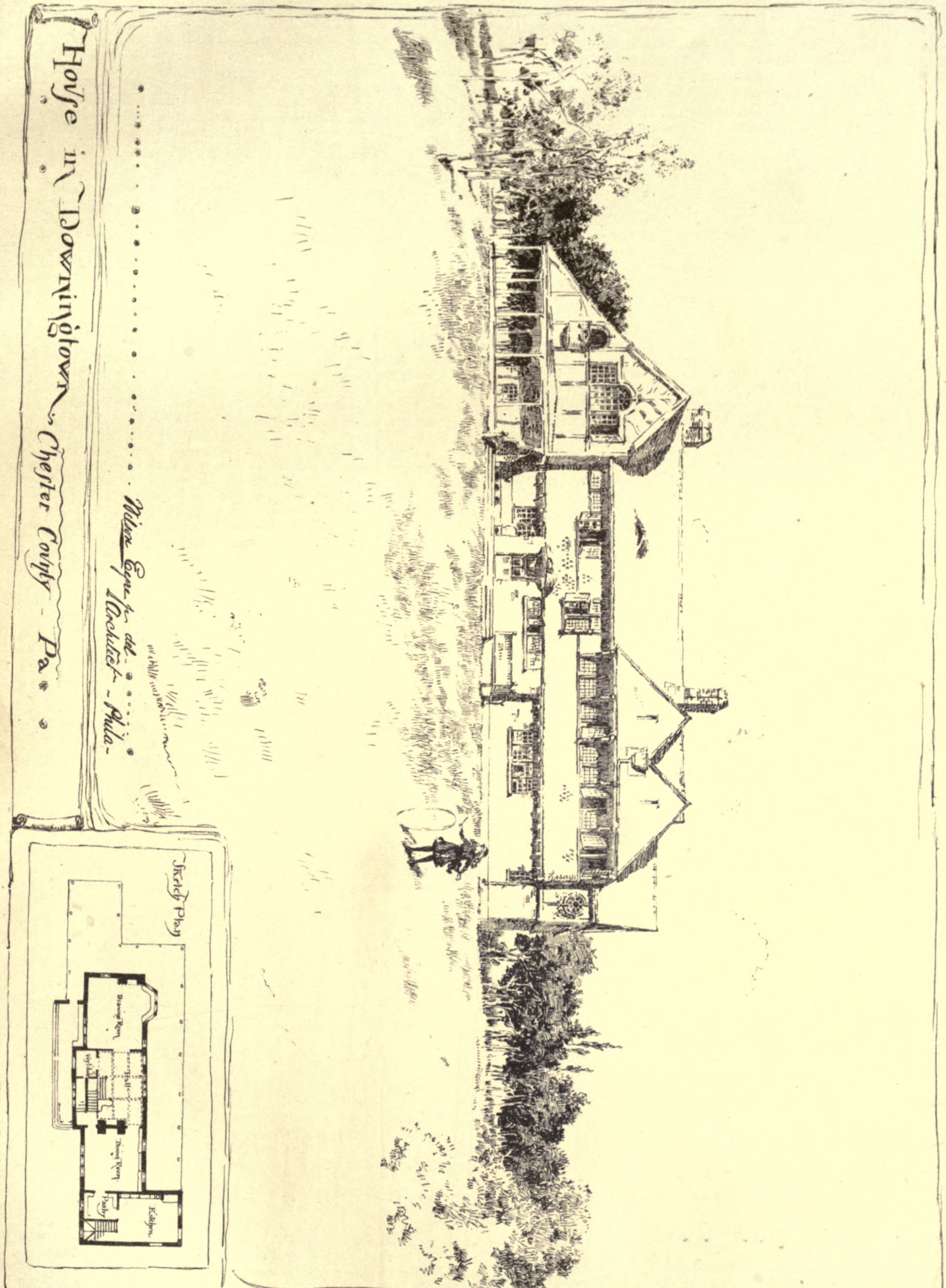

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make sure, I would have extra courses in the foundation of the higher and heavier portions, as in the hurry with which we build now-a-days every precaution is necessary. The same care should be taken with regard to oriel-windows or projections which do not go to the full height of the building, and consequently have not the same pressure on the foundation.

The walls to which these projections are attached should not only be well founded, but the tie or bond which unites the one wall to the other should be left free on the upper beds, so as to allow for the subsidence of the heavier wall without causing the fractures so often seen where this precaution is not taken.

2. How to place Stone in the Building so as to secure the greatest Strength and Durability.

Before saying anything as to the various kinds of work put upon stone, or the modes of building, let me state that for durability all stones should be laid on their natural beds, especially such as are highly stratified. All stones, however compact in their nature, have a line of fracture, which the quarryman or hewer can easily detect; and although there are a few stones, such as the Liver Rock of Craigleith, Binnie and Redhall, which show little lamination, and may be used with the natural face exposed, the use of stone in this way should be the exception and not the rule.

Another consideration in the use of stone for important buildings is that of having it quarried, stored, and seasoned for some time before being hewn and placed in the walls. By these means the natural sap is allowed to evaporate, and the stone tested as to its quality. This would add to the cost; but the money would be well spent if this precaution prevented the wasting of stones from the rains, frost, or atmospheric influences which, especially in our cities, soon act on the surface of a newly-quarried stone.

Stone that is quarried the one day and built-in the next is in a green state, and unfit for use. It is not in condition — it is at its weakest; its pores are open and ready to absorb not only moisture, but the gaseous and disfiguring influences which tend to its destruction. Every hewer knows that to get a polished surface on a stone that has lain for some time is very different from what he gets on one fresh from the quarry, and this of itself should be sufficient evidence to warrant the precaution I have recommended, which is to thoroughly season the stone before using.

To know what *good* stone really is, and how it can best be used, the architect who practises in this city, or the student, has not far to go to see not only the most durable stone, but also variety of masonry, as exemplified in such as Holyrood, Heriot's Hospital, and the residential buildings of the Old Town, erected centuries ago; or turning to the modern buildings of the New Town, stone of equal durability and variety of masonry, as shown in the polished work of the better class of buildings of the terraces, crescents, and squares, such as Royal Terrace, Randolph Crescent, Moray Place, or Charlotte Square; while in George Square, Gilmore Place, Thistle Street, Rose Street, or Jamaica Street work of a cheaper kind has been adopted, all which are not only instructive, but interesting, in showing what masons could then do in erecting buildings that have stood the test of time, which makes no mistake in exposing what is good or bad in many things besides the art of building. My next consideration is —

3. How to use Stone in laying a Good Foundation.

In my paper on "Building Stones" I gave the result of some experiments in testing foundation-stones for the chimney of the Edinburgh Gas Company, and the result of these experiments proved to my mind that as you enlarge the area of the stone a greater proportion of resistance is gained, and that a laminated stone, such as Hailes, would increase in strength according to its surface more in proportion than that of a Liver Rock stone, such as Redhall or Craigleith.

I notice this more particularly to show that a soft stone, if laminated, of large area, fairly dressed on the beds and joints, and bedded on what I would call a swimming bed of mortar, so that every portion of the surface of the stone would get a fair share of the work it had to do, need not be rejected.

Foundations should have the courses of sufficient breadth to admit of scarcements on either side and all round, so that the wall, pier, or pillar resting thereon may have a good footing, and equal resistance through and through to prevent sinking. I have known, from the neglect of this, worse than subsidence happen, owing to the foundation-courses being filled with ordinary rubble in the centre, which, yielding when the pressure came, brought down the building, involving not only loss of life and property, but questions of responsibility that had to be settled in a court of law.

The subsidence of the walls of a building occasioned by a bad foundation or inferior work above does not show itself all at once — it takes time to tell whether the foundations have been well or ill laid upon an unyielding strata, badly bedded stones, or a faulty construction; but once it does begin to fracture, the unequal, and what I would call the unfair, strain that is thrown upon other portions soon leads to serious consequences.

4. How to use Stone in the building of Retaining-Walls.

The chief object here is to build so as to lean to and resist pressure from behind. To do this satisfactorily the excavations should be dug deep enough to secure the resistance necessary to meet the thrust when it comes; the walls should be built of the largest material that can be got, and bedded at right angles to the batter on the face. Small-sized stones in such a wall are useless. Heavy material, well dressed and bonded together, so that when the pressure comes — in most cases suddenly — every stone will be ready to take its fair share in preventing an overthrow — that is what is wanted, not small-sized material which has no time to bond and get that unity of resistance which such a structure requires.

5. How to use Stone in the building of Rubble.

Of walls built there is a great variety. Enduring walls of common rubble masonry or walls built with stones of irregular shape as they come from the quarries, if well put together, well dressed, well knocked to their bed, and built from front to back, so as to bond and get them to work together, may be built; but if, on the other hand, as is too often the practice, such work is done by running up one side of the wall before the other, without bonds or ties, such as are required to unite the whole, then nothing but failure can be the result.

There is another kind of rubble of which we have some admirable examples in the city — that is coursed rubble. This work was done entirely with the piened hammer, without chisel mark of any kind; and when well bonded and backed, walls of the most enduring kind were got.

Where what is called squared rubble is adopted, with ordinary rubble for backing, the practice of running up the outer face should not be allowed. No worse masonry could be built than this, and it is to be regretted that so much of this kind of work is being done in our city. It is not only bad in itself, but leads to our younger masons being trained in a most objectionable style.

Speculation in building, where cost appears to be the first consideration, has led to much of this same kind of work, although I am by no means sure but that there is something else to be blamed, and that is, that many of our masons have not been properly trained, owing greatly to their being allowed to break their indentures, and not serving their full time of apprenticeship.

Masons were better trained when it was more the custom than it is now of indenturing apprentices for a term of years, usually five. Three were devoted to the art of hewing, and two to the art of building. When the term expired it was usual for the master to attach a certificate to the indenture stating how good an apprentice he had been, and his qualification to take his place as journeyman; and he was proud of the document as showing what he was and what he could do. This was a good custom, and one which I would like to see revived by the masters or workmen's unions whose interest it should be to have well-trained men in their ranks.

In specifying rubble-work architects should be careful in making clear the kind of work they require, as many questions have had to be settled in court which might have been avoided if more clearly described, or if, what is better still than any specification, the kind of work was shown to contractors before estimating.

There are so many different kinds of rubble, such as common, squared, random, hammer-dressed, nidged, and pick-dressed rubble, and rubble where the stones are limited in length, height, and breadth of bed, which comes to be a puzzle to the mason, if specified for walls, such as I have seen built in this city. These should be made perfectly clear by the architect by sample, so as to prevent after disputes, and show exactly how the stone is to be treated.

Another kind of rubble which was much in vogue when the houses in Moray Place, etc., were built, as shown in the back walls of the same and also in the front of the older houses in George Square and Gilmore Place, was that of coursed rubble. As the term indicates, the stone was taken from the rubble, squared and faced entirely with the cairn hammer I have before alluded to, and it is well to notice from these examples how shapely and well done the work is—some of it brought to a surface by squaring the stone so as to show the natural face, and others by using the piened hammer for dressing off any inequalities, and bringing it more within the term of what we call "nidged" work, only with much less labor than that required for this more costly style of masonry.

(*To be continued.*)

THE ILLUSTRATIONS.

THE UNITED STATES COURT-HOUSE, QUINCY, ILL. MR. JAMES G. HILL, SUPERVISING ARCHITECT OF THE TREASURY DEPARTMENT.

MISCELLANEOUS IRON-WORK IN BOSTON, MASS. SKETCHED BY MR. J. SIMS TROWBRIDGE, BOSTON, MASS.

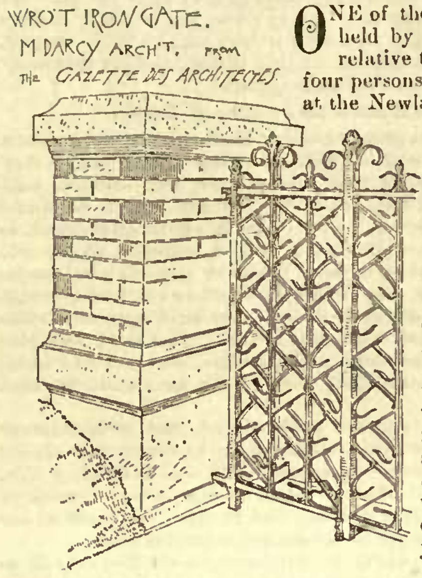
HOUSE ON CLINTON AVE., BROOKLYN, N. Y. MR. F. H. JANES, ARCHITECT, ALBANY, N. Y.

HOUSE IN DOWNINGTON, CHESTER CO., PA. MR. WILSON EYRE, JR., ARCHITECT, PHILADELPHIA, PA.

THE lower part of stone, the second story of tile and rough-cast

IRON CURTAIN FOR THEATRES.— Herr Hajek, of Aussig, constructs his fire-proof curtain of corrugated sheet-iron, and in two parts, divided horizontally. The portions are attached to the ends of two chains or iron-wire ropes, one on each side of the stage, passing over grooved pulleys. The upper portion, which rises above the proscenium-opening, is slightly heavier than the lower, which sinks below it, so as to facilitate the closing in case of danger; while in opening, the resistance to be overcome is only that due to the difference in weight between the two portions.—*Journal of the Society of Arts.*

THE HISTORY OF THE NEWLANDS MILLS CHIMNEY, BRADFORD, ENGLAND.

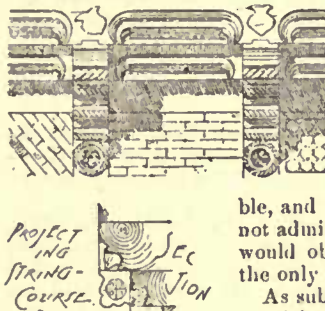


One of the witnesses at the inquiry held by the coroner of Bradford relative to the deaths of the fifty-four persons by the fall of a chimney at the Newlands Mills, was Mr. William Moulson, a member of the firm of Messrs. John Moulson & Sons, builders. He said that about the beginning of May, 1862, his firm had a contract with the late Sir H. W. Ripley and Mr. E. Ripley, for the erection of a chimney at Newlands Mills. No plans or specifications were drawn up when the contract was taken, but before commencing the work he had some conversation with Sir H. W. Ripley, and was asked to give a tender for a chimney 80 yards high, with a 9-foot flue, a base of 24 feet, two courses of footings, and a bed of concrete two feet thick at the foundation. The footings were to be 28 feet square and 12 inches thick for the first course, and 26 feet square and 12 inches thick for second course, and the chimney was to be built in all respects like the chimney that had just been completed at the Bowling Dye Works. He was also requested to give an alternate tender for a chimney with a 10-foot flue, a 26-foot base, and a height of 80 yards. No written particulars were given to him, and he made out the tender before leaving the works at Bowling. He was instructed to go on with a chimney having a nine-foot flue, the amount of the tender being £942 5*s.* 10*d.*, exclusive of the coping, which he estimated at £40. Sir Henry said that he would instruct his architect, the late Mr. Andrews, to make plans, and have the ground laid out where the chimney was to stand. Subsequently some conversation took place about the foundations. Sir Henry Ripley suggested that five pits should be sunk to the coal workings—the better bed coal which at that point was usually 2 feet 6 inches thick. The centre pit was to be 9 feet in diameter, and each of the corner shafts 6 feet. Thomas Pitts was to be asked to give a tender for the sinking of the pits, and the packing was to be done by day work and material. He himself agreed with the suggestion that these were necessary steps. His uncle, the foreman of his firm and a practical man, assisted, he thought, at the deliberations. On May 22, 1862, the tender was obtained from Mr. Pitts, and immediately afterwards the site of the chimney was selected, in the presence of Sir H. W. Ripley, the architect, Mr. Andrews, and the clerk of works, Mr. Morforth. An indented portion of the ground being observed, it was uncovered, and an old shaft, apparently used for getting coal, was found. The shaft was 8 feet by 6 feet, and Sir Henry suggested that it should be used as the central pit. Mr. Andrews, Mr. Pitts, and himself considered that this would be safer if used for the centre pit than for the corner pits, and orders were at once given for opening the shaft and sinking to the bottom, before the other shafts were begun. Pitts would at that time be over fifty years of age, and he had not seen him for more than ten years. The shaft was opened. He did not go down, but his firm's foreman did, as Mr. Pitts worked under their direction, being paid at the rate of 8*s.* a yard for the old shaft, and 9*s.* 6*d.* a yard for the smaller shafts. The packing was extra, and cost £95 14*s.*, including the material. They then dug out, under his supervision, the foundations for the chimney, 30 feet by 14 feet. Four other shafts were sunk by Pitts, one at each corner of the site, each being six feet in diameter. The five shafts were afterwards filled with concrete, consisting of Skipton lime, broken stone, engine ashes, and sand, all blended together. The material was tipped into the shafts from a stage as hot as was practicable, each shaft being filled alternately. There was, he thought, no pounding or ramming of the concrete, which was nearly liquid, and almost levelled itself by the drop. Men were, however, sent down to level it. When the shafts were filled, a bed of concrete 2 feet 6 inches thick was placed over the whole area of the chimney's foundation, which was 30 feet square. Foundations were then placed upon the concrete, the first course being of sound rag stones, 28 feet square. The joints were made up with good lime-mortar and levelled. A second course of similar footings, 12 inches thick, crossed the joints of the first course. The stones were faced and the joints filled up with mortar, bedded off and levelled. He did not think that Mr. Andrews was on the spot just before building was begun, but the clerk of the works was there daily, and had an opportunity of seeing the levelling. This was done by the men who had assisted at the foundations, Mr. Illingworth being the leading man. The clerk of the works, Mr. Morforth, was very particular, and used a spirit-level. The same person expressed an opinion that both the fire and red-brick work agreed upon was too light for the chimney. They consulted about it, and he concurring in the opinion, Mr. Morforth decided to speak to Sir Henry Ripley on the subject. He advised that it should be built either with dressed insides instead of backing, or with solid red-brick for the inside of the chimney. Sir Henry came on the same day, and had some conversation with Mr. Morforth, after which he was asked the difference in price between dressed insides and red-brick for the hearting. The difference would be 4*s.* per cubic yard. Sir Henry Ripley said that he did not think it necessary to dispense with the backing altogether. "Supposing," he added, "we were to increase the thickness of the brickwork to eighteen inches half-way up the chimney, and then to diminish it to fourteen inches for the remainder." Mr. Morforth replied, "I would rather have it the other way; but you, Mr. Ripley, have had a good deal of experience in chimney-building. I have had more experience in the building of brick chimneys, and do not understand so much of stone." He agreed with Sir Henry that the chimney would be strong enough with the alterations proposed. Thereupon it was decided that the erection should be proceeded with. Mr. Andrews was not present at that interview. There never was any specification of the chimney prepared, so far as he knew; nor was there any specification for any one of the four chimneys which his firm had built at Messrs. Ripley's dye-works. The drawings did not show the character of the structure. He frequently saw Morforth there, and he did not hear him make any complaint about the work. Plenty of material was always kept at the place. The erection of the chimney was begun on July 11, 1862, and the work was continued till December. The weather till then had been comparatively mild. From December the work was not proceeded with till February 28, 1863, in consequence of the state of the weather. During that time the top was wrapped up. The chimney was then a little more than forty yards high. The panels and holes were not in the original design; but after the work had been begun and the erection had proceeded to the height of about ten yards, Sir H. W. Ripley desired to have some ornamentation, and designs from architects were obtained. Mr. Morforth ultimately brought a design showing holes and panels to the office at the works, and said it was to be followed. Both witness and his father objected to it, as they believed it would greatly weaken the chimney, and they said that it would be better without them. Mr. Morforth said that Sir H. W. Ripley was very determined about having it ornamented. On the following day they saw Sir H. W. Ripley, and told him the chimney would be stronger without the panels; he smiled and said, "You will have to do it my way." The whole of the panels and holes were built as the erection proceeded; none of them were made afterwards. When the work was again begun, in February, 1863, there were no indications of subsidence or weakness. The work was continued till June 8, on which morning Illingworth, after plumbing it, said the chimney had gone over a little. The attention of Morforth was called to it, and he went to see the architects. In the afternoon the late Mr. Andrews came to the place, Sir H. W. Ripley being also there. A number of men were immediately set to work in clearing the foundations. Sir H. W. Ripley then gave instructions for the whole of the chimney to be examined and plumbed; and Mr. C. Woodcock and his assistants were engaged two days upon this work. He reported that there had been a slight settlement on the northeastern side of the foundations. Morforth suggested that a man named Woodman, of Manchester, should be sent for to straighten the chimney. This was done, and Woodman after examining it, said, "I can straighten the chimney and make it as strong as before." He pointed out how he could do it, saying that he had by the same means straightened many chimneys. He said he should cut right through the chimney on the opposite side, and put in half an inch thinner course. Sir H. W. Ripley agreed to his doing this, and arranged that witness's firm should provide him with labor and material with which to do the work. The operations were conducted under Woodman's directions, and he selected the point at which the cuttings were to be made. By the first cutting the chimney was brought back half a yard, plumbed from the top. Woodman was well satisfied with this, and said that by another cutting he would be able to make it straight. A second cutting was made about two feet above the first, which brought the chimney as nearly straight as possible. After the new masonry had been put in, it was discovered that two corners crushed down; and under Woodman's directions these were cut out and replaced with new stone. Their account for labor and material in connection with the straightening of the chimney amounted to £144 0*s.* 10½*d.*, which was paid by Messrs. Ripley. The work of erection was proceeded with, and the chimney was completed by the following November. During the progress of the work after the straightening there was no further subsidence. At that time he (witness) had had twenty years' experience in building operations, and had had to do with the erection of many chimneys. He could not account for the subsidence, except that it might be caused by quicker drying on the south side. About three years after the completion of the chimney they were employed to effect some repairs at it. Sir H. W. Ripley made the communication about it, and was present when it was examined. The chimney was slightly cracked on the side opposite to that which had been cut. The cracks were on the northeast, east, and southeast sides. He then formed the opinion that cracks were caused by the oscillation of the chimney at the point where the courses had been thinned. The portions of the outer shell which were bulging were taken out and replaced. The work occupied about seven

weeks, and involved an outlay of £96 19*s.* 4*d.* The "hearting" was exposed by the removal of the outer shell and it appeared to be quite solid. No cracks remained in the chimney after these repairs were completed. There was no limit as to what was to be done to the chimney. The order of Sir H. W. Ripley was to repair the chimney thoroughly. It was done by day-work and charging for the material used. He did not know whether the interior of the chimney was examined; it was in use at the time. Since then he had not been called upon to execute any repairs to the chimney, nor had any member of his firm. He had noticed for some time that the chimney again leaned in the same direction: he first observed this five or six years since. He had noticed this when passing along Ripley Street. On December 13, last, he observed that it was leaning more than it had done previously since the straightening. He had heard it was intended to repair it, and went along Ripley Street purposely to look at it. The chimney was then leaning eastward. The operation of straightening would break a number of the through stones. It was through Mr. Horsfall, one of the tenants, that he heard the chimney was to be repaired. Mr. Horsfall a week previous asked him to examine the chimney and give a written report. He told Mr. Horsfall he could not do that unless he was requested to do so by Messrs. Ripley.

By Colonel Seddon: When the chimney had been partly built, Sir H. W. Ripley expressed a desire to carry it to a height of 100 yards; but after it had canted and Woodman had straightened it, orders were given to complete it as soon as possible, and the idea of making it 100 yards high was abandoned. As to the foundation, the wall of the old pit-shaft was allowed to remain. The four shafts which were sunk appeared to have a firm surrounding of earth between them and the centre shaft. The weight of the chimney would be between four and five thousand tons. The concrete bed was quite hard before they began to build. No cramps were used in the foundations. He had known cases in which buildings had cracked in consequence of being upon old pit workings. He doubted whether the most careful packing of an old working would prevent the ground from giving way in some instances, even if the workings were at a depth of 40 yards. The old pit shaft was lined with dry wall-stones. It did not appear to be coming away. All the filling was taken out previous to beginning the operation of packing, which was started from the centre shaft. Originally the two flues into the chimney were 5 feet 3 inches. It was afterwards decided by Sir H. W. Ripley to have them 6 feet 3 inches. At the commencement the work was being done without drawings; but when the drawings were prepared it was decided on the alterations. They had then got as far as the spring of the arch; and when the alteration was decided upon the work was pulled down again right through on that side. That was on the northwest, and also a portion of the west face and adjoining angles. The whole of the new work was properly stepped or tied in; and no one could see there had been any alterations. Mr. Morforth ordered the alterations to be made as soon as the plans were brought; and he acted upon the instructions from the late Mr. Andrews, the architect. He did not know on whose authority Mr. Andrews acted in this matter. There were not more than two openings into the flues, about a foot square. The same quality of lime was used throughout the work. It was Skipton lime. Doncaster and South Empsall lime were better for mortar ground in a mortar mill. Both these kinds of lime were much used by builders in this district in 1863. They were not dearer than Skipton lime. He was not aware that the main flue at the base now measured ten feet: if it did he should think it was the result of expansion by heat. He had never known an instance in which a 9-foot flue had been expanded by heat to 10 feet. He was not aware that the inside casing of the chimney had been altered since it was built. When the chimney was built there was a 3-inch cavity between the red-brick and the fire-brick; it was never intended to be a 6-inch cavity. That was carried out all round the chimney to the height of 30 feet. He suggested that brickwork or inside wall-stones should be used throughout the chimney instead of packing. Sir H. W. Ripley suggested the method which was adopted, and he agreed with his suggestion; but from his experience as a builder, he was of opinion that by using bricks or wall-stones, instead of packing, the chimney would have been much stronger. After what had occurred, he did not think that chimneys of that size should be built with packing. The weak point of such work was its evenness of character, and its being more likely to settle. The fire-brick lining was entirely independent of the common brick; there were no ties between them. The fire-brick lining was finished off with red brick; there were some openings left, but the fire-brick had to support the red brick above. There would be an opening on each face about three inches square. These openings were two courses high, and a half-brick in width. The fire-brick was laid with every fourth course in headings, and he thought that would be stronger work than if all had been heading courses. The red-bricks were laid in heading courses about every fifth course. The stone ties were built into the red-brick to the extent of about four and a half inches, and ran about half-way to the packing; corresponding ties ran from the outer case and overlapped the ends. There was not a bed of throughs extending all round. There was a through at every yard in height, making a total of 560 throughs; but more than this number were put in. In building they did not impose any restriction as to the use of the throughs; where they would come in they were used. The photograph of the ruins (produced) did not show headers every fifth course; there were eleven courses shown in which he did not detect any stretchers; it appeared as if they had been broken. He did not think that eleven heading courses would be weak construction in a confined place like that. It was not the usual practice to build so; and it would be no saving in the cost. He attributed these eleven courses being put in to inability to obtain the circle bricks, which were supplied by Messrs. Pearson & Son, Mill Lane. It would have been better if stretching courses had been put in them. These heading courses were at the base of the chimney, and would have to carry the greatest weight. He believed the heat in the chimney would cause great expansion in the inner lining. In the present day it was the practice in erecting chimneys to leave the fire-brick free at the top for expansion, and also to allow a greater cavity, which in this instance was three inches. The greatest expansion would be below; and the red-brick lining resting upon the fire-brick lining would be liable to be raised; but he had not had any experience of that. He had known instances of chimneys being dislocated at the top, but he could not say whether it was due to a cause of that kind. He thought the force of the expansion would be upwards, and must carry before it the lining resting upon it. The same effect might result from the sinking of the packing, which was composed of ordinary rubble and ordinary mortar. There was no foreman or clerk of works whose sole duty it was to watch the work done at the chimney, so that stones might be laid on edge without his knowledge, and too many heading-courses might have been put in the brick lining. There would be no advantage to this firm or to the workmen in doing this. As to the straightening of the chimney by Woodman, he thought the effect of the cutting would be to throw the weight of the chimney on that side, and he formed the opinion that it had been rocking from that point. The weight of the chimney, to a great extent, after the straightening, would be concentrated on the opposite side of the foundations. That was on the side on which it had been cut. If the foundations were at all shaky, the tendency would be for the chimney to go on the other side; and if so it would bring the base of the structure straight again. In that case the top of the chimney would lean in the opposite way, through having been cut. The effect of the straightening process would be to injure the masonry on that side, by the tearing and breaking of the throughs, which would loosen the mortar. This effect would be more above the cut than below; but there would be some injury done to the structure below. The two cuts were about two feet apart. — *The Architect.*

A NEW METHOD OF TUNNEL BUILDING.[1]



MR CROSBY said: I desire to call your attention to a new, and, as I hope to show, an improved, method of constructing submarine tunnels. I need not say that the submarine tunnel has become in many cases a necessity. Actual connections are required wherever practicable, and there are rivers to cross that will not admit of being bridged, because a bridge would obstruct navigation, and a tunnel is the only alternative.

As submarine tunnels are made now, they are driven through the earth at a considerable depth below the bottom of the stream, because there must be overhead a roof sufficiently strong to support itself and also the overlying waters during the process of construction. The great depth to which the tunnel must be carried necessarily requires either long approaches or steep grades.

Some years ago I was led to inquire whether there might not be a feasible method of tunnelling through the stream, instead of going beneath it. From time to time I gave the subject more or less thought, and have arrived at what I believe is a practical solution of the problem. My plan is really a compromise between the ordinary submarine tunnel and a bridge; avoiding the great depth of the former, and not obstructing navigation like the latter. In short, it is a tubular iron bridge, resting on the bottom of the stream, or in a trench dredged across the river-bed; though, if navigation requires it, the trench may be deep enough to bring the top of the tunnel level with the bottom, the tunnel in this case being completely buried. The idea is to construct the tunnel on the bottom of the stream, whenever practicable; and to bury it only where it is necessary to avoid obstructing navigation, or where the strength of the current or the character of the river-bed may demand it.

I will now explain briefly my plan for constructing such a tunnel. We will first suppose that the approaches to the tunnel are completed, and that on each shore of the stream a proper abutment has been built enclosing in its lower part a short iron tube lined inside with brickwork, and having the dimensions of the proposed tunnel. The abutments will be constructed by means of coffer-dams, and when completed, the river ends of the iron tubes (which are really portions of the tunnel) will be closed water-tight with temporary wooden bulkheads. The coffer-dams are then removed, and we are ready to begin the construction of the tunnel proper.

The first step is to prepare the bed for it. If the tunnel is to lie

upon the bottom of the stream, the only preparation necessary will be to partly level its bed. If the tunnel is to be wholly or partially buried, a suitable trench will be dredged out in a line between the abutments. When required, the sides of the trench will be supported by sheet-piling. The tunnel itself is essentially a large tube, strengthened by ribs of angle-iron, and lined with brick. It is built in sections of 100 to 500 feet each, according to circumstances, the shortest sections being used where there is a strong current in the stream, or where the bed is of a quicksand nature and requires to be dredged out. On streams not over 500 feet wide the crossing may be effected with a single section.

These tunnel-sections may be advantageously built on ways, near the water, and when completed launched broadside, the ends being first closed water-tight with temporary wooden bulkheads. The brick lining may be partially laid before launching if it is deemed expedient. The upper courses of iron plates are not put on until the interior masonry is completed. They are then fastened down with screw-bolts, and the iron shell coated with asphaltum. The end rims or flanges of the sections should be of cast-iron, and so constructed as to fit accurately, and should be provided with suitable screws for binding the sections together, and also with a rabbeted recess for holding the temporary bulkhead. The section having been launched and the inner masonry completed, it is towed to the tunnel site, and, flanked by large scows, is placed directly over the bed prepared for it. After the iron shell has received a heavy coat of asphaltum, the outer masonry is added, the section being now buoyed up by the scows.

At some point, probably the centre, there should be a man-hole of suitable size, with an entrance-tube fitted to it long enough to rise a few feet above the water when the section is resting on its bed. This entrance-tube is removable, and is held in place by guys.

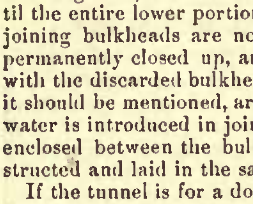
Estimates that I have made show that a section so constructed, and of a size suitable for railroad purposes, would be about one-tenth heavier than its displacement of water.

On each side of the sections suitable guide-piles will be driven; and now, placing the structure as near as possible in such a position that its shore end shall be in a vertical line over the river end of the short section built in the abutment, we lower the section by means of suitable machinery to its bed. By means of the guide-piles, and various other mechanical devices unnecessary to mention, the two tunnel-sections are brought directly in contact, and are secured by large screws, or other appliances. It is intended that the rims, when fastened together, shall be water-tight. Concrete is then run down until the entire lower portion of the section is imbedded in it. The adjoining bulkheads are now removed, the man-hole is securely and permanently closed up, and the entrance-tube taken off to be used with the discarded bulkheads on the next section. These bulkheads, it should be mentioned, are to be strongly braced on the inside. No water is introduced in joining two sections, except the small amount enclosed between the bulkheads. The remaining sections are constructed and laid in the same manner.

If the tunnel is for a double roadway, there will be two of the tubular sections, side by side, joined together by means of strong trusses, and there may also be a suitable communicating passageway between the sections.

The advantages claimed for this method of submarine tunnelling are: first, that a tunnel can be built at a much less depth than by the present mode, and will consequently have shorter approaches and lighter grades. Second, a tunnel can be constructed much more rapidly than at present, as the various processes of approach-making, dredging, section-construction and placing are intended to be carried on simultaneously. Third, the iron-work may be done at any point, however distant, provided there is water communication to the tunnel site; for tunnel-sections, with their strong bulkheads, are very buoyant, and are fully capable of taking an Atlantic voyage. Fourth, it will be cheaper, as there can be no caving in, and no breaks. Success is assured from the start. And lastly, it will be, in my opinion, a preëminently safe and durable tunnel. The strong iron shell prevents the possibility of a break or leakage, and the structure, when complete, is simply like a tunnel in homogeneous rock with the advantage of an iron lining.

PROPOSED BUILDING FOR THE AMERICAN INSTITUTE OF ARCHITECTS.



New York, February 16, 1883

CIRCULAR of the Board of Trustees to the Members of the Institute in reference to a proposed Competitive Exhibition to take place at the Annual Convention in 1883, at Providence and Newport, Rhode Island, as authorized by a resolution passed at the Convention of 1882.

To ——

Dear Sir: You are invited to submit drawings for the above competition upon the terms, and in the spirit of the following

REPORT OF COMMITTEE TO BOARD OF TRUSTEES UPON A "NATIONAL STYLE."

As a Committee of One to whom was assigned the duty of preparing a report for the action of the Board of Trustees of the American Institute of Architects, relating to the instructions given them at the last Convention, concerning the fostering of an "American Style of Architecture," by announcing various competitions to its members with a view to that end, I would report as follows:

In my opinion the Board of Trustees cannot adopt in its entirety the results of the debate upon this subject, viz: that a distinctively American style is probable, or even possible in the near future. Styles among civilized nations were born, not made to order; born, not new-fledged and complete, but gradually evolved from necessity and local circumstances, and the result is that which follows healthy growth and sound principles in construction and ornamentation. Such styles have endured, and are worthy of our admiration and respect to-day, and it is a perfectly natural sequence that in our new country, peopled as it is from the old world — all its nationalities being here represented — we follow precedent; and in the amazing hurry of our lives, find time only to adapt, if we do not adopt the result of the lessons so learned. Moreover, the times are changed, and we change with them; travel, in its more comparative ease and safety, opens the world's high-ways and by-ways to us; steam, the telegraph, and illustrated books all tend to make the world's architectural history an open page for us to read and use to our own advantage. In this way, while we have gained in information, we have lost the *concentrated* energy that animated the builders of the olden time, and are apt to fall into the danger of ever seeking some new thing. Hampered by no traditions, we pick and choose here and there, and mould and adapt to our own uses, ideas of ornament and construction that may or may not be suitable to the every-day needs of our intellectual life, and our practical surroundings.

But out of this no distinctive ideal of any style that can be called national has yet been evolved. Our students have either been educated abroad, or instructed here by professors who are imbued with ideas so gained, and whose models and text-books refer rather to the past than to the future. Our Colonial architecture was of course an adaptation of old-world ideas, often in a new form of construction, and was in so far, a new departure. Gradually, the fact of timber construction being a necessity in extending the means of rapidly housing an increasing population has developed a vernacular style, which having no artistic merit at first, or, indeed, until recently, has at this present a decided charm in its best type; that of the country-house, both in its artistic effects, and its completeness in domestic comfort, without being a servile copy of anything known to us in books or illustrated magazines, and is owing to the best efforts of our architects having been put forth in that direction.

Ruskin defines architecture as a "political art," and therefore its highest development is to be found in cities, where wealth gives the means, and the highest type of intellect, its impetus; and it is here that the greatest failures are apparent by their conspicuousness. The contrast between the cities of this new country and their prototypes, is not one that causes any complacency on our part as far as their architecture is concerned; and yet we have the same starting point, viz: that of sound construction and true principles of design, avoiding flimsiness on one hand, and extravagance on the other. The question therefore arises, keeping these kinds in view, can we graft upon the necessities required by local circumstance and honest truth in construction, any new principles of design that may eventually be called "American?"

The attempt to answer this question has been decided for us, for the time being, in the instructions given the Board of Trustees as the result of the debate in the last Annual Convention; the end will show whether those instructions were wise, and whether the consequence will be one of which American architects will be proud.

With the above end in view, it is desired that the Board of Trustees present for open competition among its members, a problem, or series of problems, to be worked out during the ensuing year, and the design submitted to be exhibited at the next Annual Convention.

To remove the problem decided upon from the realm of the ideal, and to make it eminently practical, it may not be amiss here to announce that the nucleus of a building-fund has been started through the generosity of one of our Fellows, for a building in New York City, to be the official home of the American Institute of Architects, and for all its members. This building should contain a suite of rooms for that purpose, one of which should be sufficiently large to serve for lectures, conventions, meetings, exhibitions, etc. In addition, a parlor of moderate size, a library and a reading-room; the rest of the building should be designed with such ample office accommodations for architects and other tenants, with stores and warehouses on the lower floor, that the rental would free the Institute from all such expense.

The lot should be a corner one, say 50′ x 100′, the longer side facing the south; the shorter one, the west. Entrances may be on either street.

The competition will be hampered with no instructions as to material, design or arrangement other than the above, and is, of course, to include all necessary safety-appliances and conveniences, sanitary heating, ventilation and plumbing.

Fire-proof construction is to be desired. The fact that the records of the Institute have just been exposed to the great danger of fire in the building lately occupied by the Secretary, renders the question of fire-proof qualities a very serious one. The Institute is now burned out, and the records, books, pamphlets and photographs seriously injured, if not partly destroyed.

The rental of the proposed building must be based upon the average rates in this city, viz: from $1.25 to $1.50 per square foot of occupied floor-space, and it is a necessity that this must cover the object named, viz; that of giving the Institute its accommodations free of the ordinary expense of rent, etc., where rooms are hired, and possibly render the Institute self-supporting in due time. Designs should at least show plans of floors and two elevations, at a scale of one-eighth of an inch to the foot. The designs submitted to be forwarded to the Committee of Arrangements for the next annual Convention.

The Board of Trustees reserve the right to publish such designs as they see fit, without prejudice to the others.

This, therefore, is the problem offered to those members who participated in the debate which resulted in the above instructions to the Board of Trustees, and all others who are interested in the subject, viz: the development of an "American Style" of architecture. H. M. Congdon, Committee.

February 15, 1883. — Report (amended as above after second reading) adopted, and ordered to be printed for circulation.

44 Exchange Place, New York, A. J. Bloor, Secretary.

MONTHLY CHRONICLE.

February 1. Explosion of a powder mill at Acton, Mass. No lives lost.

February 2. Walker County Court-House, at Lafayette, Ga., is burned. All the county records are destroyed.

February 4. Earthquake shocks at Murcia, Spain; Agram, Hungary; Wolfborough, N. H.; and Kalamazoo, Mich.

[1] Summary of a paper read before the Society of Arts, Boston, January 25, by Mr. F. W. Crosby, published in the Boston *Transcript.*

February 4-18. Severe floods at Cincinnati and other points in the Ohio Valley, reaching the highest point on record on the 14th.
February 5. Fire in Mt. Morris Theatre, Third Avenue, New York, before the performance.
Earthquake shock at Bloomington, Ill.
February 7. Main building of Hamlin University, near Minneapolis, is burned. Loss $65,000; the one hundred and twenty pupils escape uninjured.
February 8. The Royal Opera-House at Toronto, Can., is burned. Loss $75,000.
February 13. The Cincinnati Southern R. R. depot is undermined by the flood and falls, causing loss of at least four lives.
February 16. A mine at Braidwood, Ill., is flooded, drowning seventy men.
February —. New Theatre at Altarad, Hungary, is burned.
February 20. Floor of a hall at Thrasher's Corner, Ont., Canada, falls during a political caucus. Many hurt, no one killed.
Fire in a Roman Catholic Parochical School on Fourth St., New York, causing a panic resulting in the death of seventeen children.
February 27. Earthquake at Newport, R. I.

BLASTING WITH QUICK-LIME.

PHILADELPHIA, February 27, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — Can you give me any information in regard to the preparation of the quick-lime cartridges mentioned in your issue of February 24th? I would like to have them tried in some very awkward places where I am engaged in getting dimension stone from an old quarry, and oblige, Yours faithfully, T. RONEY WILLIAMSON.

[SEE *American Architect*, Vol. XI, p. 191, and Vol. XII, pp. 80 and 130.— EDS. AMERICAN ARCHITECT.]

COPYRIGHTING DESIGNS.

LONG BRANCH, February 22, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — Would you kindly say if I can protect my plans from being used by unprincipled parties by registration with the Librarian of Congress, or under the patent law. What I wish to know is, and what must interest the profession generally, can I protect my designs, say for a cottage, and prevent others from copying and executing same? I have had to do with some mean pirates in this particular, and would like to know my rights in the matter, if any. Yours truly, J. T.

[IT is practically impossible to protect executed architectural designs. The drawings may be copyrighted, but a very small variation from the original is sufficient to evade the copyright.— EDS. AMERICAN ARCHITECT.]

CALCULATING GIRDERS.

ILLINOIS INDUSTRIAL UNIVERSITY, CHAMPAIGN, ILL., February 23, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — It gives me pleasure to find that the essay on "Girders" has aroused some interest in the subject among the profession, as evidenced by the criticism contributed by "J. W. P." to your issue of February 10.

Your correspondent should not forget the statement of the object and plan of the essay, made on page 157, Vol. XII: "To collect these formulæ and methods, show their relation to each other, and to put them into convenient form for the use of the architect or draughtsman, *using the simplest possible methods*, is the object of this essay."

It was considered that this precluded any elaborate discussion of nice theoretical points, which are very interesting and useful in their proper place, and suggestive to those possessing the requisite preliminary knowledge of the higher mathematics, and also limited the mode of treatment of the subject to the development of a general method, which could be safely entrusted to the use of any draughtsman of average ability, possessing sufficient perseverance to master it thoroughly. In such a case, a method giving a slight excess of strength is certainly to be preferred to one more complex, which reduces the margin of safety to its lowest limit, and also introduces a much greater liability to error in its application.

Again, the coefficients employed in the formulæ for the resistance of materials are mostly obtained from experiments on carefully-selected specimens of small size, and the recent experiments of Professor Lanza on full-sized wooden beams and columns show that the real factor of safety is much smaller than is generally supposed. Until these questions relating to the actual strength of materials have been settled by exhaustive experiments, which will probably cause as much change in values and formulæ for other constructive elements, as did those of Bouscaren, Clarke, and Laidley, in the formulæ for wrought-iron columns, it is certainly preferable for the architect to be sure to err on the side of safety.

It is a common experience that close attention to minute theoretical points is apt to induce a belief that the results obtained are extremely accurate, entirely neglecting the real and far greater sources of error in the formulæ or methods. Just as if a surveyor, measuring angles to the nearest quarter-degree, were to employ seven-place logarithms in working out his calculations, and then pride himself on the accuracy of his work.

I. Your correspondent appears to advance the idea that if a beam be proportioned to resist the bending moment acting at the different points of its length, it will resist the shear also; that is, that the shear does not assist the bending moment in the destruction of the beam, if this takes place.

If a beam of uniform resistance be designed, and its section be made, if possible, of such form that all the fibres are strained with equal intensity, and that they are all under their maximum safe tensile or compressive strain, it is evident that these same cannot be safely relied upon to resist the shear also, any more than a post supporting its maximum safe load could be safely subjected to a considerable transverse pressure.

This may be more clearly seen by taking the case of a bridge-truss with parallel chords, which may be considered to be a solid plate-girder with an infinitely thin web, upper and lower flanges, and with vertical and diagonal stiffeners, or web-members. The bending moment is entirely resisted by the upper and lower chords, and the shear is transmitted to the abutments by means of the verticals and diagonals, since the actual longitudinal strain on any web-member equals the shear at that point of the truss, multiplied by the secant of the angle between the member and a vertical. (Burr's *Strains in Roof and Bridge Trusses*, Ed. 1882, page 7.) If the diagonals were omitted, the verticals would still keep the chords at the proper distances apart, but no one would suppose the truss would stand for an instant.

(See *Encyclopedia Britannica*, ninth edition, Vol. 4, page 258, for a very clear demonstration of this point by Professor Fleeming Jenkin.)

Again, if a beam be supported at the ends and loaded in any manner, we find that the bending moment = 0 at each end. Consequently, if a beam of uniform resistance be designed, just sufficient to resist the bending moment acting at each point of the length, its area of section at the edge of the abutment would = 0. Yet an "additional area" must be provided at those points, sufficient to resist the shear acting there, and which may be correctly obtained by the general formula for shearing on page 192, Vol. XII, since the intensity of the shear is uniform over the entire section, because no bending moment is acting there. It is also evident that an "additional area" must also be added at each of the consecutive sections towards the middle of beam, to that required by the bending moment, for an indefinite distance from the edge of the abutment, depending on the arrangement of the loading and the form of the section. (For examples of this addition, see Rankine, *Civil Engineering*, page 259, Figures 142 and 144.)

It appears to me that the true explanation of this case is the following one: —

Suppose a beam of uniform resistance and any form of section to be designed, the dimensions of the consecutive sections to be determined by the respective bending moments acting at them. Also, that the load be concentrated at a point midway between the abutments. The shear will then be uniform between that point and each abutment, practically requiring a uniform area of section to resist it at each of the consecutive sections, provided that the forms and proportions of all sections of the beam are similar. The fibres of each section are strained by the bending moment itself in proportion to their distances from the neutral axis of the section. Suppose that of each layer of fibres, parallel to the neutral axis of the section, a portion are strained to their maximum safe limit, or the same as the most distant fibres of the section, and that the remaining fibres of the layer are not strained at all, but may be relied upon to resist a portion of the shear acting at that section. We may say that these last fibres compose, for the entire section, a "remainder area," which resists the shear acting there. It becomes evident that, according to the form of section, the length of the beam, and the arrangement of the loading, this "remainder area" may either be in excess of the required amount, equal to it, or less, at the centre of the beam where the bending moment and dimensions of sections are greatest. Also, that as we pass towards either end, the sections diminish with the bending moments, while practically the same "remainder area" is required, because the shear is constant. Consequently, at that point where the "remainder area" equals the required area to resist shear, we must commence to add sufficient area to the consecutive sections to make up the deficiency, and we have just seen that the entire shear area must be added at the ends, because there the section and remainder area are each = 0.

Again, suppose that the load be as before and remain constant, but the clear length of the beam be diminished. The remainder area of the middle and largest section will become equal to the required shear area, at some limiting length of beam, and if the length be further diminished, the remainder areas of all the sections become smaller than the respective shear areas, and additional area must be added to every section to make up the deficiency.

The same reasoning is true of any form of loading, though the shear and shear area will then be variable and not uniform throughout the entire length of the beam.

It is very evident that the practical application of this process in designing a beam or girder would prove to be lengthy and quite laborious, and that the small saving of material possibly obtainable would rarely compensate the architect for the time required, above that necessary for the application of the method given in the essay on girders.

Moreover, Rankine's formula (referred to by J. W. P.) is not employed by engineers practically, who are certainly thoroughly alive to any possible and probable saving in material and cost.

Rankine says: (*Applied Mechanics*, page 341.) "When a beam consists of strong upper and lower flanges or horizontal bars connected by a thin vertical web or webs, like the wrought-iron plate-girders to be treated in a subsequent section, the shearing force is to

be treated as if it were entirely borne by the vertical web or webs, and uniformly distributed.

Professor Fleeming Jenkin says: (*Enc. Brit.*, Vol. 4, page 265.) "The value of M, the bending moment, must be calculated for a sufficient number of cross-sections of the beam and for various distributions of load. . . . The maximum shearing stress must next be calculated for each of the above sections. . . . The engineer can now compute the number of square inches, Sc and St, required at each section consistently with the factor of safety he chooses to employ. . . . (to resist the bending moment M.). . . . The web will next be designed by giving it such a thickness as will, with the depth already fixed, supply the number of square inches required to reduce the stress per square inch to the *safe* or *proof* shearing stress."

Professor Wood says (*Resistance of Materials*, pages 196 and 197):

1. That for a beam supported at ends and loaded uniformly, if of uniform breadth, its upper and lower edges will form an ellipse, ends tangent to verticals through edges of abutments, with reference to bending moments only.

2. That for shear alone, "if the resistance to transverse shearing varies directly as the transverse section," the beam would be composed of two triangles, whose vertices are at middle of beam.

3. That "practically the two cases may be combined by adding the ordinates of the triangle" to those of the ellipse.

(This is exactly the method given in the essay.)

4. That "theoretically, I do not see how they can be combined, since the conditions established are not only independent, but are not simultaneous. Each question furnishes a determinate equation. One is an equation of moments and the other of forces. The *practical* solution above suggested, doubtless gives an excess of strength at all points, except at the ends and middle; for by increasing the depth we increase the moments of resistance, and probably add more than is necessary to resist the transverse shearing, since that is greatest near the neutral axis where the strain from moments is least."

When girders are of uniform cross-section throughout, as is usually the case when made of wood or wrought-iron, the effect of shear may be neglected in many cases, especially when the arrangement of the loading is a continuous one, whether uniform or not. Then the dimensions of section are determined by the maximum bending moment, at which point the zero shear is also found. The "remainder area" increases from that point towards the ends much faster than the area actually required to resist the shear.

The preceding certainly shows that the method given in the essay on girders is either identical with that employed by the best authorities, or at least is as economical, and that to employ the method suggested by Rankine would not be practicable or profitable.

Those wishing to study that view of the subject suggested by "J. W. P." will find an excellent graphical method of treating it given in Clarke's *Principles of Graphical Statics*, page 123, *et seq.*, which is more easily applied than the analytical method of Rankine.

II. Obtaining area of "Inertia" Figure.

The method given by "J. W. P." had been considered, but it was thought that the one given would, on the whole, be less liable to lead to error and mistakes in its application, and would be sufficiently exact for all practical purposes, if the horizontals were taken reasonably near each other.

Your correspondent does not appear to notice the following points, which would occur in making a practical application.

1. The equilibrium-curve coincides with the tangents above and below the horizontals drawn through the top and bottom of section.

2. Practically, it is most convenient to make the distance between horizontals equal to some convenient fraction of an inch, which may or may not be commensurate with distances from horizontal through centre of gravity of section to top and bottom of section.

3. If commensurate, the method is admitted to be correct. If this be not the case at either top or bottom, the extreme ordinate at that side would fall outside the horizontal through top or bottom of section.

4. No area is added thereby or error incurred, other than that resulting from considering the curve to be a polygon of small sides.

If "J. W. P." will draw the section full-size and take the horizontals not over one-fourth of an inch apart, I do not believe that he will be able to detect any difference in the results obtained by his method and those of my own.

The examples worked out in the essay were given as examples of the application of the method, rather than specimens of minute accuracy, for they were executed somewhat hastily, and errors may occur in them. They were only drawn at one-third full-size, and the horizontals were taken one inch apart.

III. Wooden girder composed of two timbers, one above the other.

Since no reliable experiments have yet been made to determine the relative strength of double wooden girders, and those of a single timber of the same section, keyed and bolted as described, so far as I am aware, it would certainly be presumption on my part and a mere exercise of judgment or guessing, to assume a numerical value for this ratio. Consequently, it has been thought preferable to assume that the gain resulting from keying and bolting the two timbers together should be considered as offsetting the loss from cutting the timbers for keys, bolt-holes, gains for ends of joists, etc. I have no doubt that there is a considerable excess of strength, but it is certainly best to be sure first, that our construction is absolutely safe, afterwards making it as economical as possible.

The writer has little faith in the application of theory to difficult problems in construction, unless it be based upon and corrected by the results of trustworthy experiments. Yours truly,

N. Clifford Ricker.

NOTES AND CLIPPINGS.

The Castle of Marburg.— The ancient castle of Marburg, near Cassel, in Germany, is being restored by the order and at the personal expense of Emperor William. The castle, which was built in the thirteenth century, is a splendid remnant of the old Gothic architecture and filled with numerous and precious historical and artistic reminiscences. It was the residence of the princes of Hesse until 1604; in it Philip the Magnanimous was born, and there, at his instance, occurred the religious debate between Luther, Melanchthon, Zwingli, Oecolampadius and others. In the still habitable portion of the castle are kept the state archives of Cassel, Fulda and Hanan, which contain, besides valuable documents relating to the time of the Reformation and the Thirty-years' war, the ancient Carolingian annals since 752.— *Exchange.*

Ancient Mode of Baking Walls.— Among the recent discoveries at Hissarlik by Dr. Schliemann are the remains of buildings which he supposes to have been temples. The walls are respectively 1.45 metres and 1.25 metres thick. Nothing, he says, could better prove the great antiquity of the buildings than the fact that they were built of unbaked bricks, and that the walls had been baked *in situ* by huge masses of wood piled up on both sides of each wall and kindled simultaneously. Each of the buildings has a vast vestibulum, and each of the front faces of the lateral walls is provided with six vertical quadrangular beams, which stood on well-polished bases, the lower part of which were preserved, though, of course, in a calcined state. Dr. Schliemann maintains that in these ancient Trojan temples we may see that the *antæ* or *parastades*, which in later Hellenic temples fulfilled only a technical purpose, served as an important element of construction, for they are intended to protect the wall-ends and to render them capable of supporting the ponderous weight of the superincumbent cross-beams and the terrace. Similar primitive *antæ* were found in two other edifices, and at the lateral walls of the northwestern gate. It was also discovered that the great wall of the ancient Acropolis had been built of unbaked bricks, and had been baked like the temple walls *in situ*. According to Dr. Schliemann, a similar process of baking entire walls has never yet been discovered, and the *antæ* in the Hellenic temples are nothing else than reminiscences of the wooden *antæ* of old, which were of important constructive use.— *Scientific American.*

Rings no Guide to a Tree's Age.—M. Charnay, in one of his *North American* papers a year ago, declared that he did not trust the concentric rings of a shrub as a record of its age in years. He had put the popular theory to a test during his Central American explorations, and had found it to err. Dr. A. L. Child, in a recent issue of the *Popular Science Monthly* says, he never until then had seen the authority of this age-record disputed, and when he came, some months later, to cut down four small trees which he knew were planted in April, 1871, he resolved to test the matter, and found that, although they had only twelve years' growth in them, he could count oneach from 35 to 40 concentric rings. "I could select twelve more distinct ones," he says, "between which fainter and narrower or sub-rings appeared; nine of these apparently annual rings on one section were peculiarly distinct, much more so than any of the sub-rings; yet, of the remaining it was difficult to decide which were annual and which were not." Dr. Child then proceeds: "Now, to ascertain what relation or connectionthere might be between the meteorology of the several seasons and the growth made during the same, I selected from my meteorological records the maximum, minimum and mean temperature, and the rainfall of the six growing months of spring and summer of each of the twelve years of growth. These extracts I have tabulated, and have also appended to each season the thickness of the ring formed, as measured on the oblique cut previously described. The examination of this table shows a general relation of cause and effect between high temperature and large rainfall and greater growth. But it falls very far short of proving a general law of 'so much heat and so much water during the growing season, to produce so much wood.' For example, compare the years 1875 and 1878. The temperature of 1878, for the season, is better than 4° in excess of the season of 1875, and the rainfall only a little over four inches less, and yet the growth of 1875 is seven times what it was in 1878. This almost unparalleled growth of 1875 — that is, as compared with the other years — cannot be explained by the above general law; but I think the May and June record of that year throws light upon it. We see there a maximum heat in May of 96° (higher than I have ever known it in an observation and record of twenty-five years), and a mean temperature of the whole month, also unequalled, of 71°, and this great heat continued through the month of June, and no cold spells after the heat set in sufficiently to check the growth. Then, in connection with this heat, the ground was well saturated with water when this heated term began (May 6), by 1.62 inches of rain on the 4th. From this on to the 26th of June, fifteen inches more of rain fell, so apportioned over the time as to keep the ground saturated. This synchronous excess of heat and water evidently produced the abnormal growth. And probably, as this matter is further studied, it will be found that these agents, rightly proportioned, operating synchronously, produce these thicker rings; while as one or the other is in excess or absent, the growth is checked, and thus has time to condense and harden, and form these sub-rings; and the more frequent these alterations, the greater the number of them."

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A GREAT deal of discussion is now going on in New York in relation to the new building law which is pending before the Legislature. We are not sure that we are in possession of the exact text of the bill at present under consideration, and therefore refrain from attempting to criticise it, but our impression is that it curtails to a certain extent the discretionary power given under the present law to the Inspector of Buildings, besides defining and correcting some of the imperfect provisions relating to other matters. Among architects and builders the proposed law seems to be regarded with very various feelings. Some of the best architects, particularly, consider that any law which restricts construction by the rules of a single inelastic system is objectionable, and believe that the end which all regard as desirable would be best gained by a statute laying down a few general requirements, but leaving architects to exercise freely within those requirements such skill and inventiveness as they may possess, subject, however, to a strict accountability for the consequences of any error or carelessness. Others, perhaps with equal reason, think that although unnecessary sacrifices of convenience or appearance are often made in order to conform to the present law, it is unsafe to allow irresponsible builders that liberty in matters of construction which might, with great advantage, be conceded to skilled architects, and that, since speculators of this kind can only be controlled by a minutely detailed statute, or by the orders of an inspector armed with a very wide discretion, it is better, of these two alternatives, to choose the former.

THE Chicago Master-Masons' and Builders' Association has issued a rather spicy circular, reciting the defects of the ordinary forms of building contracts, and calling upon fair-minded persons to adopt better methods of making agreements for such purposes. To assist them in doing so, the circular contains as an appendix a new model for building agreements, which seems to have some excellent points. Before criticising this, however, the circumstances which led to its preparation should be understood, and it appears that the Association has had its attention called to several provisions in contracts recently carried out which seem unfair and wrong. In some cases these have caused serious misunderstanding, and in many others they might become the means of injustice and oppression, and would become so except for the integrity of the architects, who are made the sole judges of the mode in which they are to be interpreted, and usually exercise their discretion with a fairness which blinds the incautious builder to the injury which he might suffer if a less honorable person should undertake to use the same authority to suit his private ends. As examples of the provisions which the Association considers to be objectionable, the circular quotes some rather curious clauses, one of which, for instance, says that "Omissions which may occur in the plans and specifications, and be discovered during the progress of the work, will be required to be supplied by the contractor, as if the same had not occurred." The clause reminds one of the specification for a certain public building, which wound up by remarking that "these specifications are to be regarded as including everything necessary for a first-class building, whether the same are particularly mentioned or not," and it is not surprising that the associated builders should object to it; but other matters are condemned which we should be sorry to see omitted from building agreements.

IN particular the circular denounces the very common practice of prefixing general conditions to specifications, on the specious, but not very sound theory that "the builder's contract consists of three instruments, viz: the plans, comprising all drawings necessary to clearly set forth and illustrate the design; the specifications, to describe and specify the character of materials and workmanship to be employed in the execution of said design, and to elucidate the same on such points as may be found impracticable to show on plans, and give such further information to the builder as he may need to estimate on the cost of the work referred to, or for the correct execution of the same; and the articles of agreement, which should contain all conditions and covenants entered into by and between the parties thereto, and define the rights and duties of the architect," and that "while these three instruments are correlative parts of one whole, they are distinct in their nature," and neither should contain matter properly belonging to any of the others. The objection to this argument is that the general conditions, which recite the responsibilities which the builder is to assume, furnish him with quite as much information respecting the cost of the undertaking as any part of the specification, and nothing is more annoying, to the architect and owner as well as the builder, than to find it necessary, after an estimate has been submitted in accordance with the specification, to add something to the price, or go through further negotiations, on account of provisions in the contract which the owner wishes to insist upon, but which the builder had not contemplated in his estimate. Of course, it is essential that the general conditions and the contract should not contradict each other, but if care is taken to make each of these include all the provisions which are to be regarded as essential, the submission of an estimate made in accordance with them, as well as the remainder of the specification, will show that the builder understands all the conditions which may affect his offer, and a contract including the same conditions can be signed without disappointment or discussion, while a simple acceptance of the tender, often the only contract made between the parties, will bind both to all the provisions which the general conditions express.

THE investigation into the causes of the fire which occurred a few days ago in the large apartment-house known as the Cambridge Flats, in New York, causing the death of two persons, is of great interest to those who occupy such buildings. It seems that the fire, which caught in the lower story of the building, ran up through a light-shaft, enclosed by plastered studding, filling the upper rooms and halls with smoke. Most of the occupants who found themselves in danger easily reached the street by means of the fire-escape at the rear of the structure, but of the two ladies who lost their lives one was too old and feeble to attempt climbing down seven stories of iron ladders, and with her daughter endeavored to descend the stairs. If she had been as active as most persons, this might have been accomplished safely, but even the fear of death could not give her power to make very rapid progress, and with her faithful daughter, who would not leave her, she was overtaken by the smoke and suffocated. Although the building was constructed in accordance with the present building law of New York, which many persons already find too strict, it is plain that such a result was, under the circumstances, unavoidable. That fire should ascend from the basement through the nearest open shaft is a matter of course, and it is equally a matter of course that if such a shaft is lined with plastering on wooden laths and studding, the laths will very soon curl, and throwing off the plaster will take fire and increase the conflagration, at the same time transmitting it to the stories above, and the smoke from the rapidly-increasing fire is sure to burst out through the windows which open on the shaft, and fill all the

rooms which communicate with it directly or indirectly. According to the Inspector of Buildings, there is now no way of requiring such shafts to be constructed of fire-proof materials, as they certainly should be. If, as he thinks advisable, they were left open at the top, the statute would regard the partitions enclosing them as external walls, to be built of brick, but if they are simply covered by a skylight they may be considered as enclosed by partitions, which can, under the law, be of wood-work.

A SINGULAR problem in engineering is presented to the committee which has in charge the construction of the pedestal for the great statue of Liberty in New York harbor. About eighty thousand dollars out of the necessary two hundred and fifty thousand have been raised, but nothing has been done about the work. It is probable that operations would be begun at once with the funds in hand, if it were not that no plans have been made, and no architect or engineer has been engaged to make them, the committee not having been able to find any member of these professions willing to contribute them for nothing, or rather, for the "great credit" which, "if properly done" they will "reflect upon the designer and engineer." As the value of the drawings and superintendence for the pedestal alone, to say nothing of the responsibility of seeing the statue placed safely upon it, would be about twenty-five thousand dollars, we fear that the committee will look long before they find the individuals whom they seek. The task itself, independent of any consideration of proper payment for the time and responsibility involved, is not one that the most skilful engineer would wish to undertake hastily. The statue weighs, complete, only about eighty tons, but presents an immense surface to the wind, and stands, moreover, on a comparatively small base. Considering that it is not extremely easy to construct a brick chimney of the same height, — one hundred and forty-eight feet, — weighing ten times as much, of pyramidal form, and standing on the ground, so as to resist the force of a storm, the difficulty of raising and securing the statue, not on the ground, but on the top of a pedestal nearly one hundred and fifty feet high, is apparent. There are no precedents for anything of the kind, and it will hardly do to secure the figure by the rope stays, like those of a derrick, which the incapable engineer would naturally resort to. The members of the committee seem themselves to have perceived something of the difficulty of the undertaking, and have telegraphed to France for instructions as to the mode of doing the work. We do not generally volunteer advice, but it seems to us that the plan said to be employed by the Japanese for securing their light pagoda towers against the effects of wind, by means of a long weight, or pendulum, hung from the top of the tower, and reaching nearly to the floor, might perhaps be employed with good effect for the New York statue. A very similar device, applied by Sir Christopher Wren, has for two hundred years held up the spire of Salisbury Cathedral, as well as those of one or two other English churches, in which a heavy wooden framework, extending as far downward as the construction of the tower permits, is suspended by strong iron bars from the cap-stone, free to swing in any direction. The effort of the wind on one side of the spire inclines it until the hanging framework rests against the opposite side, but when the pressure is relieved, the pendulum swings back, bringing the stone-work with it into its original place.

AN enterprise which was first set on foot in Baltimore and Boston, has recently been extended to New York, in the shape of what is called a Title Company, the officers of which obtain copies of all records relating to real estate, and make abstracts of the title to any given pieceof land on the payment of a reasonable fee. As this work is now generally confided to lawyers, who are obliged to spend a good deal of time in following up a given title, and of course make a charge to correspond, the Title Company expects, with great reason, that its abstracts, which can be very quickly made by persons having its facilities in the way of classification, and familiarity with the deeds of any given place, will be much sought after by those who wish to avoid the expense of employing a lawyer for the same service. In Baltimore, where the company is already prepared for business, five dollars is the regular fee for searching any given title, and a guaranty of its accuracy is given for an additional premium of one dollar for each thousand dollars of value involved. For some reason, the copying of the records has been opposed by the Registrars of Deeds in Baltimore and New York, who probably have a vague notion that no one has a right to the possession of duplicate records, but this feeling is likely to disappear as the value to the community of better facilities for obtaining clear statements of the validity of deeds and mortgages of real estate becomes more fully demonstrated. There is an immense amount of work, in the shape of comparison of boundaries, tracing of inheritances and dower, and verification of names, which no lawyer can undertake in the course of his examination of a single title, and no Registrar of Deeds can enter into, but which, if properly done, would save continual disputes and losses among the owners of real property, particularly those of small means and limited experience; and if any company will thoroughly accomplish this task, which is a long, but not a very difficult one, it will deserve the thanks both of the rest of the community and of the lawyers themselves, as well as such fair remuneration as it may ask.

AFTER a great deal of discussion, a lease for ten years has been given to an association of capitalists of a number of small tracts of land in the Yellowstone National Park. The lease comprises seven tracts of land, aggregating ten acres in extent, and it is provided that no tract shall be within a quarter of a mile of any of the Geysers, or of the Yellowstone Falls, and that no building erected upon any of them shall obstruct the view of the natural curiosities of the Park. In return for these rather meagre privileges, the association agrees to erect at once a hotel near the Mammoth Hot Springs, to cost one hundred and fifty thousand dollars, and to contain at least two hundred and fifty rooms, and also to construct six smaller hotels, upon plans to be approved by the Secretary of the Interior. The lease contains also a clause prohibiting any employé or agent of the association from killing any deer, elk or buffalo in the Park. The large hotel is to be begun at once, in the hope of completing it in time for receiving guests this summer. Notwithstanding the clamor made about the leasing of land in the Park, we are disposed to think that the public is to be congratulated upon having found any one willing to spend so much money in building upon land granted for so short a term, and we cannot see why the lovers of nature should not be pleased to think that future tourists will be decently and comfortably accommodated in the Park, instead of being obliged to camp about over it, leaving everywhere the disgusting exuviæ of their sojourn.

A SUCCESSFUL attempt was made a few days ago to communicate by telephone between New York and Cleveland, a distance of seven hundred and one miles. The lines of the Postal Telegraph Company, which are of heavy copper wire, presenting a very small resistance, were used, and with the Gray and Dorrance instruments not only conversation was perfectly heard, but the minor sounds about the offices, such as the handing of the receiving telephone from one person to another, and the comments of the bystanders in the room, were clearly audible. This is, if we are not mistaken, the greatest distance at which telephone communication has yet been held, and the success of the experiment promises a great extension of the use of the instrument. Before this trial, the longest wire over which conversation had been carried on was, we believe, that of the Rapid Telegraph Company, between Boston and Baltimore, a distance of about four hundred and fifty miles. The wire used by the Rapid Telegraph Company, like that of the Postal Company, is of very low resistance, and with the ordinary Bell telephone conversation was readily heard.

THE Moffat Building in New York, a conflagration in which came near destroying the records of the American Institute of Architects, stored in the building in the office of the Secretary of the Institute, took fire a second time a few days ago, and, as usual, the first intimation of the occurrence was given by the light of a blaze which filled the upper story, bursting from the windows and skylights. The portion of the building in which this second fire occurred was unoccupied, and the total loss was less than ten thousand dollars, but the reputation of the structure as a storehouse for valuable goods, which has never been very high, will suffer still more from its having been the scene of two conflagrations within a month, each of them sufficiently serious to require the help of a large portion of the fire department for extinguishing it.

CONSTANTINOPLE.

CAP-ITAL, FROM THE CHURCH AT CHEZAL-BENOIT.

IT is difficult to separate any one set of ideas from among the many fancies suggested by a first acquaintance with Constantinople.

History, romance, love of form, color, all assert their claims upon the imagination, and form a varied web, through which it is difficult to follow a selected thread.

Now-a-days, studied architectural effect has little to do with the appearance of a city from a distance. The time is past when a group of temples, with relative positions and combined effect carefully adapted to the *point de vue* of the surrounding country, crowned the acropolis of towns whose houses were simple, unobtrusive masses of gray stone, blending with the site upon which they were built, or when porticos and terraces rich with statues were meant to be seen before the city gates were entered. The best that can now be hoped for is a picturesqueness arising from the lines of the site itself and the grouping of buildings, occasionally accented by one more prominent than the rest. This picturesqueness Constantinople has in a marked degree. Important buildings have naturally gravitated towards commanding sites, and the mosques have been founded upon the highest points, and rise above the lines of houses upon the Golden Horn and the streets clambering up the hillside. Little wonder that the band of Greeks, seeking to fulfil the prediction of their oracle that they "should dwell opposite the blind men," held that the people of Chalcedon must have been blind to have neglected this peninsula: a long ridge, jutting out into the Sea of Marmora, commanding a view of the Princes' Isles and the range of Bithynian Olympus above the Asiatic shores, it is — apart from its strategic importance,— one of the fortunate spots of the earth.

Along the shores of the Marmora, around the Seraglio Point and far up the Golden Horn stretches the wall of Aurelian, broken here and there by masses of buildings or dark groups of cypresses in the Seraglio gardens; the towers attacked again and again, still rise from the sea, while above them is the hillside covered with clustering houses of all hues and descriptions, toned into harmony by age, and here and there flecked by the light reflected from the dome of a mosque. Above rise the great mosques, Santa Sophia, and those of Ahmed I, Suleiman the Magnificent, Mohammed II, Bayezid and Osman, each with its small domes bubbling up to the base of the great one, its minarets rising into the sky in delicate spires. The lines of wall, the dappled mass of houses, the sweeping curves of the domes and perpendicular lines of the minarets — all add elements that contrast with and enhance the others, while across the Golden Horn and the mouth of the Bosphorus Galata and Scutari repeat the beauties of Stamboul, as in a fantastic mirage. Nor is the spell that seems cast over the eyes of the traveller broken upon landing and entering the streets; it still remains enchanted ground for the artist and scarcely less so for the architect. Picturesqueness is omnipresent: there is not a phase of occupation, a mode of doing or being anything, that is not intensely picturesque. The most trivial event takes color from such a setting. It is all an embarrassment of riches from which, when one subject has been selected, the astonishment is that it is so simple after all. In the long lines of seductive shops, each is an apartment with the entire front open to the street, the opening spanned with a sweep of arch, built frequently of alternate voussoirs of stone and thin Roman bricks. The tympanum is occasionally filled with a turned iron grille, or a thin stone pierced with quaint Eastern devices. These shops are closed at night by long, narrow shutters, panelled in various ways and folding into the jambs of the piers during the day. Within there is a confusion of shelves and cases of dainty design; the backs and sides of the divans and of the little tables for the universal coffee are worth noticing. They are usually simple in form and richly inlaid in geometric patterns; and as for the brass and copper utensils, the arms and vases, the bits of decoration upon them are numberless, even the Persian and Turkish inscriptions being decorative. The Eastern arch, like the Eastern dome, is of two kinds: the first, a low sweeping curve; the other (Fig. II, Plate C), a pointed arch, springing for a short distance in a perpendicular line, then curving inward more or less abruptly, then taking nearly a straight line to the apex, which often becomes slightly flamboyant at the very point of the arch. The line of this arch is very subtle and pleasing. It seems to have been of Turkish origin, though probably the Turks received it from the Arabs or possibly from the Persians, when they reigned in Persia A. D. 1000. Most of the Turkish work appears to have been derived and adapted from that of other nationalities, naturally enough, as the Turk was but a hardy mountaineer forcing himself as ruler upon the nations of the East by sheer strength, and he has graced his rough-hewn kingdoms with the delicate fancies of the people he conquered. It is amusing and not uninteresting to trace the various strains of architecture which have been mingled in Constantinople. First was the Greek, whose sense of color and fine detail united with the later Roman massiveness and luxuriousness gave rise to the Byzantine, with its arches and mosaics; later came the Turk, who adopted the Byzantine forms and applied to them Persian and Saracenic detail; and last of all was adopted a diluted form of that worst of styles, the eighteenth-century Italian Renaissance, which made hideous all it touched—which was fortunately little. There seem to have been two acknowledged rules amongst the Eastern nations: first, to keep the masses broad and simple; second, to focus detail and make it interesting. No other methods could be better in their results. Projections are slight; decoration is kept flat and counts as a rich surface; and all ornament is strictly conventional, as the Koran forbids the introduction of any representation of animal form.

The earliest Byzantine churches, built in the fifth and sixth centuries, have now become mosques or jamisis; the mosaics representing Scriptural scenes are covered with plaster; the frescoes show dimly through a coat of paint. Their plans are similar throughout: a narthex; a series of north and south chapels connected with the main rectangular body of the church by arched openings, and lighted by domes, each with a circle of small windows at its base; a large semi-domed apse, often with semi-domed niches in its walls, and a great dome over the body of the church. The plans of Santa Sophia and the larger mosques are but elaborations of this, with a multiplication of parts and the addition of galleries.

The interior walls of the Byzantine churches are covered with sheets of colored marble, the two adjoining pieces having been sawn from the same block and opened like the two adjacent pages of a book, the veins rippling away from each other. In the centre of such rich expanses is often a piece more precious than the rest or some bit of quaint carving framed in a white or gray moulding, and above the doors or below the mosaic ceilings the mouldings become richly carved. This Byzantine carving though simple in character is not easily described: it depends for its effect upon sharp outlines, accented by deep cutting and usually decorates a simple form (Plate E). In the decline of Byzantine work it was coarsely cut and became merely quaint, but during the fifth and sixth centuries in Constantinople it was probably cut by Greek workmen, and was very delicate. The capitals of St. Mark's in Venice, though executed later, have much the same excellence as the best work in Santa Sophia. The impression felt upon entering Santa Sophia is marvellous. The great size and height; the warm gray tones of the masses of shadow; the richness of the porphyry columns and delicate chiselling of details; the expanse of floor stretching off into dim shafted chapels, and the great dome, misty and undefined, spreading above, letting through its circle of windows shafts of light upon the worshippers and sending back the voices of the Mollahs as they call upon Allah in a monotone — all combine to produce sensations that are not readily forgotten. In the evening of a winter's day, when the triple circlets of lamps are lighted and send a strange light flickering into the depths of shadow, the effect is even more wonderful.

The later mosques have their walls plastered, and that of Ahmed has the pendentives supporting the dome carried by clusters of columns which form massive piers. Most of the decoration in the interiors of these mosques is bestowed upon the Mihrab, or pulpit, which is frequently made of inlaid marbles and mosaics. The doors are sometimes of bronze, with intricate geometric patterns in the panels inlaid with silver and pearl (Plate B). These geometric designs are favorite forms of decoration, and are often extremely ingenious. They are based upon a system of regularly disposed accented centres, usually in groups of three or five, the intervals filled with varying designs. The designers seem to have particularly appreciated the decorative value of superimposed ornament, there being often three distinct planes of ornament in a single design, the lowest always being the most involved and least defined, the others becoming stronger and simpler in proportion as they approached the surface. The doors of the outer courts of the mosques are usually of wood, the designs being either incised or applied with mouldings. Each mosque has at least one inner, or mollahs' court, and an outer court entirely surrounding it, the openings from one to the other being filled by stone grilles; below these openings, or occasionally along the sides of the mosque, are a row of fountains for the use of worshippers before entering the great doors. It is upon these fountains, as well as upon numerous others scattered about the streets of the city, that the wealth of imagination of the Turk has been most freely lavished. He seems to have taken great pleasure in covering the surfaces of marble above these cool basins with designs, and to have carved them with a joyful exuberance. Every conceivable fancy has had its way with them, yet always with some peculiarity of execution that stamps the decoration with an individuality different from all others (Fig. III, Plate C). This is owing in a great degree to the fact that the face of all the ornament is kept upon a parallel plane with the ground and but slightly raised above it; the outline is distinct and never melts into the ground, light and shade being obtained by cutting within the profile and not into it. This is one of the simplest and most conventional styles of carving, and one of the most effective. It occurs in the Byzantine carving of the seventh and eighth centuries, in a peculiar style that obtained for a short time during the Renaissance, and can be seen to-day in the ornaments upon Venetian gondolas. There is another style of carving upon the Turkish fountains that is very different both in subject and manner of execution (Fig. III, Plate C). The design is usually enclosed in a panel and represents a cluster of flowers in a vase. It is distinctly Persian in character; the flowers are disposed in regular sequence and form highly raised centres from which the rest of the design recedes and gradually melts into the ground. The most universally used ornament, however, is that which in its simplest form seems to be a substitute for

the classic egg-and-dart moulding (Plate A, Fig. III). Though simple in its first form it becomes complex and involved until at length it seems a frost-work crystallizing about the forms it decorates. (Plate A, Figures III and V). Cornices, corbels, capitals (Plate A, Figs. I, VIII, IX and X), all partake of the character of this peculiar form of ornamentation. The galleries of the minarets are rich with it, the heads of the niches (Plate A, Fig. II) at the mosque doors are filled with a net-work of it. It varies constantly, but is always based upon some simple crystalline form, complicated by a repetition of parts.

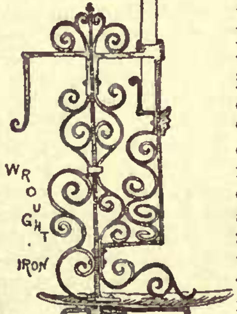
There is little to be said of the street architecture of Constantinople, beyond noticing the picturesque effect of the projecting stories of the houses, each brought forward of the one below it on long diagonal brackets, while bay-windows of all sizes and descriptions, mere fabrics of lattice-work, jut out in every direction (Plate D). The lattices are not turned as those of Cairo but are plain, crossed bars. Occasionally the ground floor is of stone, but is usually of wood, like the remainder of the house. The interior is planned at the will of the occupant: there seems to be no favorite system of arranging rooms, and with the exception of the room where guests are received, which is lighted by one large, divanned bay, there appears to be no concession made to custom. Courts with fountains, though frequent, are by no means usual.

There remains one other peculiarity of Turkish decoration, that of the use of color upon marble. The material of which the mosques and fountains are built is a somewhat coarse white marble which takes color readily, and the ground of the Turkish inscription and ornament is often tinted with pale blues and greens or dark reds, while the carving is picked out with gold. The effect is excellent. There is but little tile-work, and that little of Persian tiles.

The Byzantine mosaics are almost all covered with paint or plaster: what few can be seen are very deep and rich in color, usually with gold and colored designs on a deep blue or green ground. The mosaics in the small church of SS. Nazario e Celso in Ravenna approach them very nearly both in design and color. The mosaics cover the entire ceiling and domes of Santa Sophia as in St. Mark's, and are carried around the corners in a similar manner, all angles being rounded, thus obtaining continuity of surface and obviating the necessity of mouldings. Very little remains of the Roman art that was lavished upon the Hippodrome, or of those statues that were said to outnumber the inhabitants of the city. The iconolasts were thorough in their destruction, and the Constantinople of to-day but little resembles that new Rome that rejoiced in the art treasures of the Ægean, and became the home of Roman citizens; still it has a wealth of interest within its walls, a wonderful charm about its streets, that leave an impression upon the mind unrivalled by the memories of other lands — an impression remaining apart from all others, full of the glamour of the East.

C. Howard Walker.

ZUNI REVISITED.[1]



Late in November of the past autumn, I arrived at Fort Wingate with the intention of paying a second visit to Mr. Cushing, at Zuñi. The weather was uncharacteristically capricious, considering the stable nature of the New Mexican climate as I had known it in summer. One day the sky was of a stony gray, with cold, dusty gusts and spits of snow; the next would show the familiar overarching cloudless blue, with welcome warm sunshine tempering the bracing air; again, the sky was overcast, but softer, and the warm southwest wind blew, laden with the moisture of the Pacific. New Mexico is popularly supposed to be a warm country all the year round, but it should be remembered that the Zuñi land lies among the summits of the "continental divide," and is higher above the sea-level than the top of Mount Washington. Therefore the winter at such an altitude comes nearly as early as in New England, but it is a far milder season than it is here. Although in a dry country the distinction between winter and summer is not so marked as it is with us, nevertheless it was very perceptible, and Nature's fallow season was noticeable in the absence of hundreds of living, growing things which had characterized the region without particularly emphasizing their existence. Although the arborescent growth of the country is evergreen, and therefore its aspect was unchanged in that respect; nevertheless even the mountains and *mesas* had a sterner and a repellent look, their solemnity unrelieved by certain qualities which in the summer had invested their grandeur with a fascinating charm. Perhaps it was because the grasses and shrubs, now sere and withered, had given a certain tone to the landscape, and although their presence was not noted distinctively then, their absence had changed the whole scale of values in the picture. In the presence of the frowning mountains, the mythological fancy arose that the great gods are ever present, but at this season their troops of attendant spirits have fled, and the mood of the deities has changed.

Major Powell has pointed out, in his paper on the study of anthropology, printed in the first annual report of the Bureau of Ethnology, issued last year, how environment has been an important factor in forming the mythology of a people. It is a life of unknown centuries amid such surroundings as these wild ranges—now tumultuously tossed by volcanic convulsions, at their feet great plains stretching away calm as eternity; now expanding into wide and lofty table-lands, worn remnants of an older continent, seamed with chasms and rent by awful cañons—that has shaped and colored the religion of the Zuñis; dreary, contemplative, and often strangely poetical. But whence came one lovely trait that pervades all their myths and folk-lore, as related by Mr. Cushing, like an interwoven golden thread, gleaming through every fabric — the idea of the ultimate good existing in everything, and that even evil-working causes are but transitory, and become the means to the accomplishment of final good? It seems strange to find a feature like this in the faith of a barbaric race, and it appears to be a proof of an innate gentleness of spirit. Army officers who are familiar with the Indians in peace and war tell me that the more they see of them the more they are impressed by the fact of their common humanity, as evinced by manifold traits brought out on acquaintance, though to the average frontiersman the red man is no better and no more entitled to human consideration than any wild brute. The frontiersman, however, has good reason to fear his hatred, but I regard both his view and that of the "sentimentalist" concerning the noble savage as equally erroneous. It is only by close and sincere ethnological study, such as Mr. Cushing is giving to the subject, that the Indian nature will be seen in its true light. The real value of this study of the races of mankind on lower steps of culture is the light which it throws on many secret springs and motives of human nature, laying bare the processes of development of man on his long journey to the high conditions of civilization. To find a parallel for the same treacheries and savage cruelties which we condemn in the Indian we have to go back but a few centuries and look at our own ancestors.

The sandstone architecture of this region, carved by time with the mighty tools of the elements, is wonderful. I should think it might offer some valuable hints to the student, especially in the way of composition and the arrangement of great masses.

Looking at an *arroyo*, or gully, worn in the hard, firm soil by a water-course born in the rainy season—the plains and valleys are ploughed full of such furrows—I saw the same effects repeated in miniature, the steep sides worn and cut out of the baked red earth by the rains of perhaps but a single summer, being almost identical in form with the huge cliffs of red and yellow sandstone slowly worn by the processes of ages. So it was all only a question of relative magnitude and time.

The humble animal to whose brief life days are as years, and a league's journey a task like the traversing of a continent, toiling along at the bottom of such a gully, may look up at the towering heights of a few dozen inches with the same reverent, awe-struck gaze with which we behold the wonders of the Grand Cañon, or of the Yo Semite; and as that lowly being is ignorant of the features of this structure, the world, which impress us with wonder, because they are beyond the range of his small vision, what greater marvels may there not be in the universe of which our limited senses can know nothing. And perhaps some bright, superior race looks down upon our insignificant doings and strivings, and upon the small features of this contracted drop in the ocean of space, with the same calm contemplation and pity which we bestow upon these lower orders.

I did not expect to see Mr. Cushing until I reached Zuñi, but he arrived at Fort Wingate unexpectedly one evening, having received directions from Major Powell to visit Oraibe, one of the Moqui pueblos, and make a collection of pottery, etc., for the National Museum. The people of Oraibe, unlike those of the other pueblos, have a great fear and distrust of the Americans, owing to the representations of the Mormons, who are incessantly using all the influence they can exert to incite the Indians everywhere against the national government. A recent expedition which visited Oraibe found the place entirely deserted, the inhabitants having fled at its approach, and concealing or taking with them all their valuables. It was therefore a difficult place to make a collection in, and Mr. Cushing, by reason of his standing as a Zuñi, was peculiarly fitted to do the work, which would have been hardly possible under ordinary circumstances.

Having a friend with me who was desirous of seeing the place, I decided to visit Zuñi, although Mr. Cushing was not to be there. He said that we should be cordially received and well provided for, since he was now comfortably established in his own household, where his wife would be found, together with her sister, his brother's wife, and Mr. W. L. Metcalf, the artist. Together with Mr. Graham, the local trader, and Mr. Wilson, the teacher appointed by the government, with his family, there was now at Zuñi a considerable little American community.

The day of Mr. Cushing's departure for Oraibe we were to set out for Zuñi, but the threatening weather of the past week culminated in a severe snow-storm, the first of the season, and therefore we were delayed. That evening Mr. Metcalf appeared at the hospitable door of Dr. Washington Matthews, the post surgeon, numb and half senseless with the cold, having ridden in from Zuñi to see

[1] A paper read by Mr. Sylvester Baxter at the last monthly meeting of the Boston Society of Architects.

about his trunk with his painting-materials, and got lost in the storm while crossing the mountains. The next morning we started in an ambulance, taking Mr. Metcalf and his trunk along; Mr. Cushing's brother, Dr. Enos Cushing, accompanying us on horseback. It was still snowing slightly, but there were prospects of clearing off. It was a cold, dreary drive across the mountains, and wrap ourselves in all the blankets that we might, it was impossible to keep warm, for the keen wind searched every opening and cut like knives of ice. The protracted misery of the trip contrasted sharply with the delights of the previous year's journey over the same road in the sunshine and exhilarating air of early June.

It was dusk when we came in sight of Zuñi from the elevation of the Black Mesa, and dark when we arrived. As we drove up to the town the windows gleamed with the cheery, ruddy light of hearth-fires within, and out of many of the stumpy chimney-pots leaped lurid tongues of smoky flame. Around these fires were probably many groups of old and young, listening to the wonderful tales of folk-lore as they had been handed down for centuries from generation to generation. The sight of a Zuñi fireside in winter goes far to reconcile one to the discomforts of the journey thither. The blazing piñon stick, whose pitchy wood gives a beautiful flame; the changing light dancing over the antique interiors; the great hooded corner fireplace, and the picturesque groups, form a striking sight. The houses are comfortable, the thick walls retaining the heat from the fires which also afford the best of ventilation, and if the Zuñis should learn habits of cleanliness and adopt civilized methods in sleeping and eating they would need no commiseration.

We found supper awaiting us at Mr. Cushing's house, Dr. Cushing having taken a short cut over the trail from Las Nutrias, and arriving about an hour before us. It was the same house, that of the Governor, where we had visited Mr. Cushing before, but how changed it was. For twelve dollars and a few handfuls of broken clam-shells Mr. Cushing had bought four large rooms, which had taken about three months' labor to build—pretty cheap real estate that! Clam-shells are better than gold and as good as silver in Zuñi. "If you ever want to do us a favor," said the Governor to me in Washington, one day, "send us some of these shells, but not too many, for we do not want to spoil their value by making them common." The Governor shrewdly did not want to bear the market.

The rooms were filled with civilized furniture, and where before we had slept on the floor exposed to sundry crawling things, and had eaten from primitive dishes set on a blanket spread on the same, there were now beds, tables and chairs, with an abundance of nice crockery and cooking utensils. A negro cook brought from Washington, and trained in an old Virginia family, presided at the fireplace, whence he conjured up the nicest dishes, and a cooking-stove was on the way for his benefit. The refining touch of woman's hand was everywhere manifest. The room which was occupied by Mr. Cushing on our former visit had been transformed by his wife with charming artistic taste into a luxuriant little boudoir, in the decoration of which the local resources had been availed of in a way that gave it a peculiar interest. The floor was covered with the finest of soft sheep-skins; the walls were hung with Navajo and Zuñi blankets, whose rich and varied hues gave an effect much like Oriental tapestry. A broad divan was also spread with similar blankets, and on easels stood excellent oil-paintings, while rare and curious pieces of pottery were on the mantel-piece and arranged in nooks and corners, with decorations of rich scarfs and draperies tastefully disposed. Pictures, books, and magazines, Japanese screens and a handsome lamp completed the cozy, home-like effect.

The Governor, Pa-lo-wah-ti-wa, soon came in and welcomed me with an embrace, and a gleam of pleasure lighting up his large, dark eyes and dusky face, showed his joy at meeting an old friend. I regretted that Mr. Cushing was not there to interpret the dear old fellow's remarks, but we had to content ourselves with our mutually spare Spanish, and the Governor used, to the best advantage, the few English phrases and words he had picked up in the East. He was very proud of this accomplishment. The Governor had been pretty homesick for the East on his return to Zuñi; he was glad to get back to Zuñi, but the scenes in the "lands of the Eastern Americans" had made a powerful impression. He said that he had brought back but one side of him, and the side where his heart was was still in the East.

The next morning I found Nai-iu-tchi, the senior priest of the Order of the Bow, at his house, and he welcomed with delighted surprise the young man whom, in the East, he had adopted as his son, with the name of Thli-a-kwa, the Turquoise, or "Sacred Blue Medicine Stone." I also saw Ki-ä-si and Na-na-he, but the other two pilgrims to the East, Pedro Pino and Lai-iu-ai-trai-lun-k'ia, were out of town.

It had been a wonderfully prosperous harvest—one so great had not been known for years, and all the store-rooms were piled full with corn in the ear, looking with their many colors like great heaps of jewels—red, green, yellow and blue. The prosperous harvest had been regarded as a proof of the pleasure of the gods at the result of the pilgrimage to the Ocean of the Sunrise, and the bringing of its sacred waters to the keeping of the priests to whose prayers they would give the power to bring bounty to the Continent; for the Zuñis, like the Hebrews, regard their small nation as a chosen people. This happy result of the pilgrimage, as they regarded it, has contributed to advance Mr. Cushing's influence among them.

Poor Na-na-he, however, the giddy-headed Moqui, whose grace and agility had made him a favorite in the East, was in deep disgrace. When he returned with the other three in May, he immediately hastened to his old Moqui home to relate the wonders of his journey to his people. As seven large demijohns of the ocean water had been given to the party by the city authorities of Boston, Na-na-he believed himself entitled to a share out of such an abundance, and he promised the Moquis, whose religion is the same as the Zuñis, that when the water came they should have one demijohn of it.

When Mr. Cushing arrived in September with Pa-lo-wah-ti-wa and Nai-iu-tchi, who had remained with him in Washington and the East, the party was received with great state, and extensive rejoicings were instituted; and when the demijohns arrived there were elaborate solemnities in the honor of the water. To attend these the Moquis sent a deputation of their leading men, who were also to receive and bring back the vessel of water promised by Na-na-he; but Na-na-he had promised without the power of fulfilment. The Zuñis said that the water was theirs; they should have the entire credit and glory of bringing it, and the honor thereof should rest with the Zuñi people. If the Moquis wanted any water from the Ocean of the Sunrise they could go and get it themselves, but from Zuñi not one drop should they receive.

The result of this was considerable coolness between the two nations, but the Moquis acknowledged the justice of the Zuñis' position in the matter, and friendly relations were not interrupted. The wrath of both peoples fell upon Na-na-he. He lost the importance which the honor of making the journey had given him among the Moquis, while in Zuñi he forfeited the promised and coveted promotion to high orders, and went about in deep disgrace.

It was the height of the dancing season in Zuñi. There were dances at night in the houses and in the temples, and frequently by day in the open air. There was a public dance that day, and in the clear, crisp morning air we could hear the weird rhythmic chants of the dancers, strikingly like the voices of the wind, sounding over the house-tops from the Dance-Place. Climbing over the roofs we found the terraced sides of the amphitheatre-like rectangular Dance-Place covered with a blanketed multitude—an intense contrast of bright-hued raiments, brown faces, and glossy black hair against the sunny blue sky and dazzling snow. Down in the Dance-Place was a line of strangely-costumed dancers, all arrayed uniformly with the exception of the priest of the dance, who stood at the head of the line unmasked and motionless. All the others were masked, and upon their heads were tall mitre-like arrangements of thin, brilliantly painted and decorated pieces of board, cut into a trinity of scallops at the top. Their bodies were naked and painted a dark brown, and their necks and girdles were surrounded with fringes of spruce twigs, giving a ruffle-like effect. Gourd rattles in their hands and tortoise-shell rattles on their heels gave a strongly accented accompaniment to their singing, and to their solemn, measured steps. There was an orchestra of about half a dozen Indians dressed like women, all beating drums. This dance was probably the ceremonial of some single order. In the dance which I witnessed in the summer of the previous year, and described in an article printed in *Harper's Monthly* for June, 1882, each figure was differently costumed and masked, and represented some mythological character.

The intervals between the dances, when the dancers retired to their estufa for devotional exercises, were, as usual, filled out by the clown-like characters known as "mud-heads;" men curiously masked with laughter-provoking and piggish-looking faces, entirely nude, and painted from head to foot a light clayish color. These grotesque fellows played the most amusing tricks, and cracked jokes which provoked the merriest laughter from their public. One of their performances was particularly interesting. There were eight mud-heads altogether, and at the conclusion of a dance they came into the court, each with a number of bright-colored ears of corn tied together at the ends and hanging horizontally. They also bore large baskets filled with squashes and dried fruits. Eight women, matrons and young girls, were selected out from the spectators. Their blankets were taken from their shoulders and placed in one pile, while the corn and baskets of the men were placed in another pile; then a sort of lawn-tennis line was made across the centre of the court by scattering meal. On one side of this stood the eight "mud-heads," and on the other side the eight women. Each side stood in a line, single file, the one behind grasping the shoulders of the one in front; the two files faced each other, and all the men jumped simultaneously sideways to the right, the women at the same time jumping in the opposite direction, as if to avoid them. This play was kept up some little time, until the men caught the women. Then followed a sort of "tug-of-war," each side trying to pull the other across the line; the men made mock efforts at stubborn resistance, but the women pulled them across inch by inch until their line was about half-way upon the women's side, when it broke and the rear half fell upon their backs while the front ones were jerked suddenly across. The victory of the women was hailed with laughter and applause, and they gathered up as trophies the corn-ears and baskets of the men, together with their own blankets—all of which had evidently been deposited as a wager—and retired. During one of the intervals two ferocious-looking figures, with masks of infernal aspect and painted entirely in black, walked across the court and entered the temple, or estufa. They were followed by several boys, ten or twelve years old, clad in the brightest and cleanest of new blankets, and walking as if being led to slaughter. They were

probably children who by right of their hereditary rank — members of a sort of aboriginal nobility — were to be initiated into an order where they belonged. Poor boys! according to all accounts their ordeal was to be no child's play. One of the "mud-heads" crept cautiously to the window of the estufa and peered in, but started back in affected terror as if the sight were too awful to behold.

The dancing ended at sunset. We spent another delightful evening with the Cushings, and the next morning we set out for Fort Wingate.

THE LATE AMERICAN ARCHITECT COMPETITION.

REPORT OF THE JURY. — I.

"BUMPKIN," (see *American Architect* for March 3) in the judgment of the jury deserves incontestably the first place in the competition — not that his plan is more convenient nor more practical than some others, but because his design has a certain distinction which, by removing it from the ordinary type of suburban cottages, answers to the requirements of the programme, suggesting that the occupant of this cottage has more social prestige than his neighbors. A number of competitors offer us examples of the typical cottages to be found in countless numbers in the environs of our cities. Such designs are naturally ranked, however practical and convenient, after those which, like "*Bumpkin's*," combine practical excellence with a more novel or more artistic solution of the problem. "*Bumpkin*" shows great skill in infusing with a remarkably picturesque treatment the reserve and dignity which should distinguish suburban from rural architecture, and while there is no evidence of the author striving to be original and nothing that can be called eccentric in the architecture, it is a most fresh and unexpected conception. The plan provides a piazza which is partially roofed for summer, while a vestibule to the hall answers to the requirements of a winter dwelling. The parlor and dining-room communicate with each other and with the hall. The kitchen has an ample porch, which would, perhaps, better have been utilized for a shed, or wash-room. There is a cellar under the whole house. A furnace is depended upon to heat the various rooms, except the parlor and dining-room, which have open fireplaces. The second-floor plan is good, except that the back stairs are brought up in such a way as to waste some valuable space: by changing their position to the left side of kitchen this might be avoided. The main stairs continue up in a tower to the attic, where another room is obtained. The specifications are careful, and serve to show that the grade of work in the house is what was intended by the programme. This was all the latter calls for, and the jury did not consider their attention directed to the items of the specifications, and they have given all the latitude possible to the question of expense. "*Bumpkin*" is one of those coming closest to the sum named, but it is doubtful if any builder could afford to complete the house at the prices given. The appropriate details and brilliant drawings reveal a trained artistic hand.

"*B. S. S.*" (see Illustrations) has devised a plan which would be comfortable both in summer and winter. The front door is shut off by a vestibule, and the hall is not too large to be easily heated in winter. On the other hand the hall opens generously into the parlor which communicates by a wide sliding-door with the dining-room. Thus these rooms would in hot weather form an airy suite; their large windows would give ample draughts, and the porch serve as an agreeable summer veranda. The kitchen is well placed but no back door seems indicated. This could be easily remedied. No cellar plan is given, but it would form an important feature in the house, judging from the fall of grade shown in the perspective sketch, and would afford room for a well-lighted laundry and storage-room. The front and back stairs are ingeniously combined to meet at a common landing and thence follow the slope of the roof in a single common flight. One large room is provided, leaving beside the servant's room only two others. One of these is very small, but might be enlarged by reducing the size of the closets, and perhaps by shifting them over to the other side. The passage-way from the large chamber is an unnecessary luxury, and by entering where the bath is and shifting it to the opposite side another closet could be made. The position of the bath-room is the weak point in this plan, as economy requires it to be placed near the kitchen plumbing. The exterior is charming, quaint and homelike. There is nothing of the "suburban villa" about it; it is emphatically a comfortable cottage. The stone chimneys are treated in a novel manner, and throughout the design an effective play of light and shade is attained by simple means, if we except the roof, whose three small gables look extravagant. Their united cost would have carried up a roof with space for one or two more chambers: at least the middle gable might have been omitted and the luxury of the narrow balcony might then have been passed over more readily. The drawings are clever and show the simplicity of long practice. The specifications do not allow enough for the various items, and especially the cost of so high a basement and a stone outside chimney is underrated.

"*Danfors's*" plan (see *American Architect* for January 20) is one of the "vernacular" types above alluded to; but it is so perfectly carried out, both in plan and elevation, and the whole design is in such excellent taste, that it gains a certain distinction of its own. The plan is most economical; there are no back stairs, and the roof is of the simplest, so that "*Danfors*" has built a brick first story on two sides of the main house, and yet kept within a reasonable cost. This bit of brickwork is a great gain in giving a cosy and substantial look to the cottage. It would have been prudent to have cut off a portion of his hall for a vestibule; on the other hand, the entrance to the kitchen is well sheltered and cleverly placed. The stairs leading out of the hall are graceful and take up but little room. Cellar-stairs are indicated, but nothing is told us of the cellar, and a furnace finds no mention in the specification, but as only one of the bed-rooms has a fireplace, this may be presumed an accidental omission. Beside the four chambers of the second floor, there is room in the attic for two more; but one of these would not be available unless the stairs landed in the middle of the attic, instead of at one end as now arranged. The drawings show a crisp, sparkling touch. The details are appropriate to the simplicity of the cottage, and are in harmony with the general design.

"*Moses*" (see *American Architect* for March 3) has, by his square, compact plan, kept in view the small rectangular lot on which the proposed cottage would probably be built. In most suburban lots an irregular and broken plan wastes the ground, for unless planned with great skill, the proximity of a portion of the building to a neighboring house is as bad as if the main house stood at that same distance. The fact that the veranda is reached only from the house shows the reserve which should distinguish a suburban dwelling from a rural one. On the left of the long, narrow hall, which too much suggests a city house, are library and dining-room opening together by wide sliding-doors. The narrowness of the hall is emphasized by a fireplace which is entirely out of place in such cramped quarters. The stairs lead, however, to a more generous hall on the second story. This hall and the stairs are lighted by a dormer overhead, by which a pretty effect might be managed. The chambers are not as well arranged as they might be, and the result is a loss of space which leaves only three bed-rooms on this floor. Two rooms, however, are to be counted upon in the attic. A point to be noticed in this plan is the ingenious way the cellar-stairs lead down from the kitchen under the front flight, there being no back stairs. The details of the interior show refinement and thought, and should go far towards giving the cottage the air of distinction we before have insisted upon, but they threaten to expand the cost beyond a reasonable limit. The items given in the summary of expenses are all very low — too low for any builder to gain a fair profit upon. Taking for example $123.50 as the cost of two unusually high and large chimneys and the provision made in the basement for a furnace, then add to that six open wood fireplaces, five of which are in corners, and it would require an adventurous builder to undertake the contract. The furnace is not mentioned in the specification, but the cost of open wood-fires all over the house would result in a partial use of furnace heat. The details are neatly and attractively presented, but the perspective, in spite of its careful drawing, is scratchy and dry in rendering. As a whole, however, this design is one of the best, and deserves a high place in the competition.

"*Pecksniff*" presents an attractive cottage to the eye — one of the best in proportion and in judicious distribution of interesting features, each elevation presenting a point of interest against a background of sufficient plainness to give it heightened effect. The design is picturesque and yet is not without dignity. The details are sober and refined and show a keen artistic appreciation of architectural propriety. Unfortunately "*Pecksniff's*" facile fingers have run away with him. Within a most charming exterior he has jumbled his rooms together with the most wanton carelessness. His point of departure seems to have precluded all consideration of a winter dwelling. After a vestibule is passed one enters directly into the "living-room," from which the stairs open. Such an arrangement might be tolerable in warm weather, but impracticable for winter use. But even tropical customs do not justify making his only access to the family bath-room directly from the dining-room. The front and back stairs are combined in a way more complicated than ingenious. On the second floor the rooms open conveniently into each other, but are carelessly cut up. Though one of the five chambers is indicated for a servant's room, there is ample space in the attic for one or two more rooms, but no means of access is provided to it. "*Pecksniff*" might by a thoughtful economy in the size and arrangement of his rooms, bring his now too expensive scheme within our limits of expense. His schedule of costs is misleading, especially his item of $25.00 for plumbing, which, even were a convenient place for the bath-room near the kitchen pump provided — instead of its present impossible position — is quite inadequate for modern requirements. It is to be regretted that one who is capable of such excellent design, should appear so utterly incapable of devising or studying a plan, and we recommend to this competitor careful study of the principles and details which govern plans.

(To be continued.)

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A COTTAGE; to cost about Three Thousand Dollars.

Design submitted by B.S.S.

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Residence for Chas. Miller Esq. at Cumminsville, Cin. O. Mr. E. Anderson Archt.

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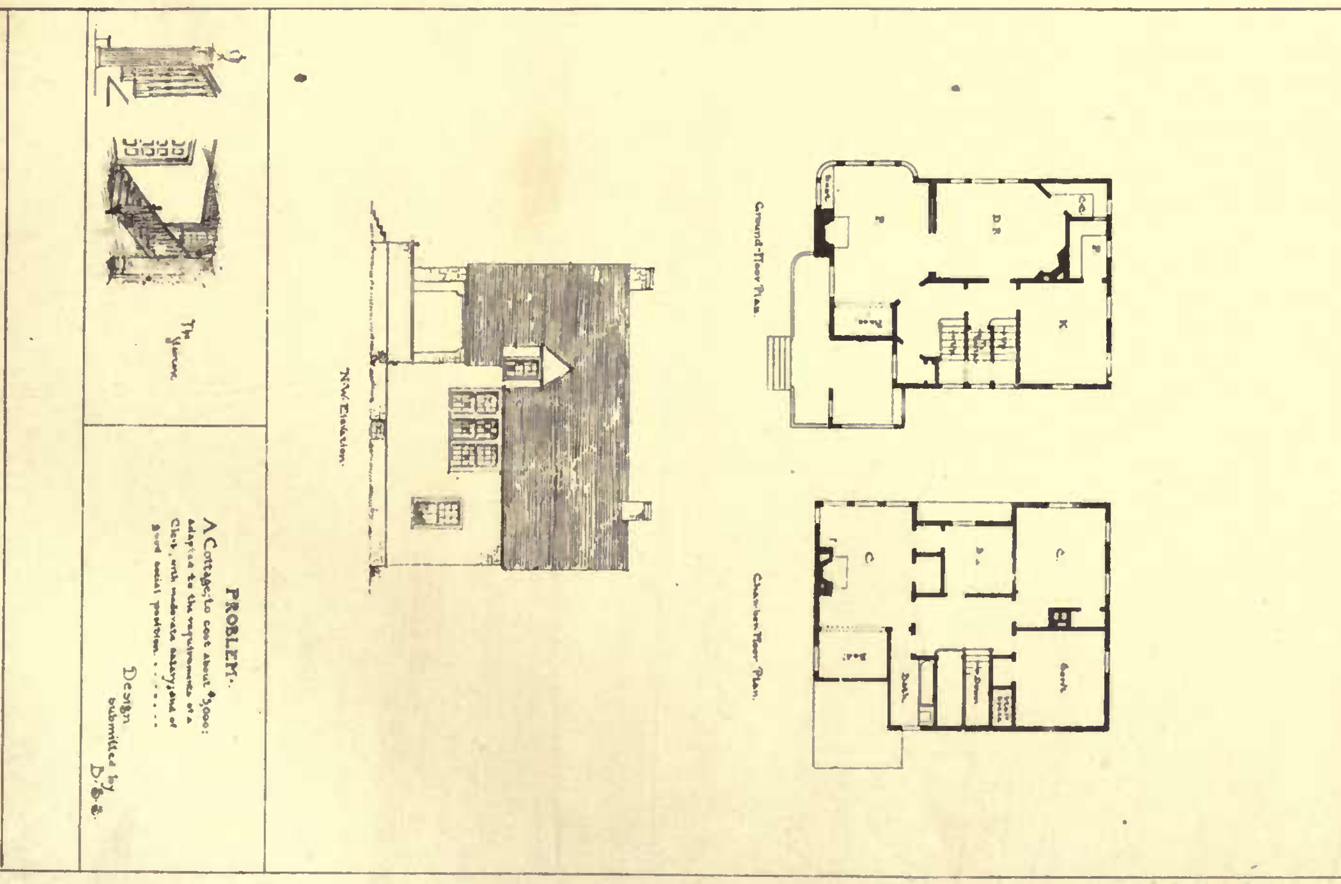


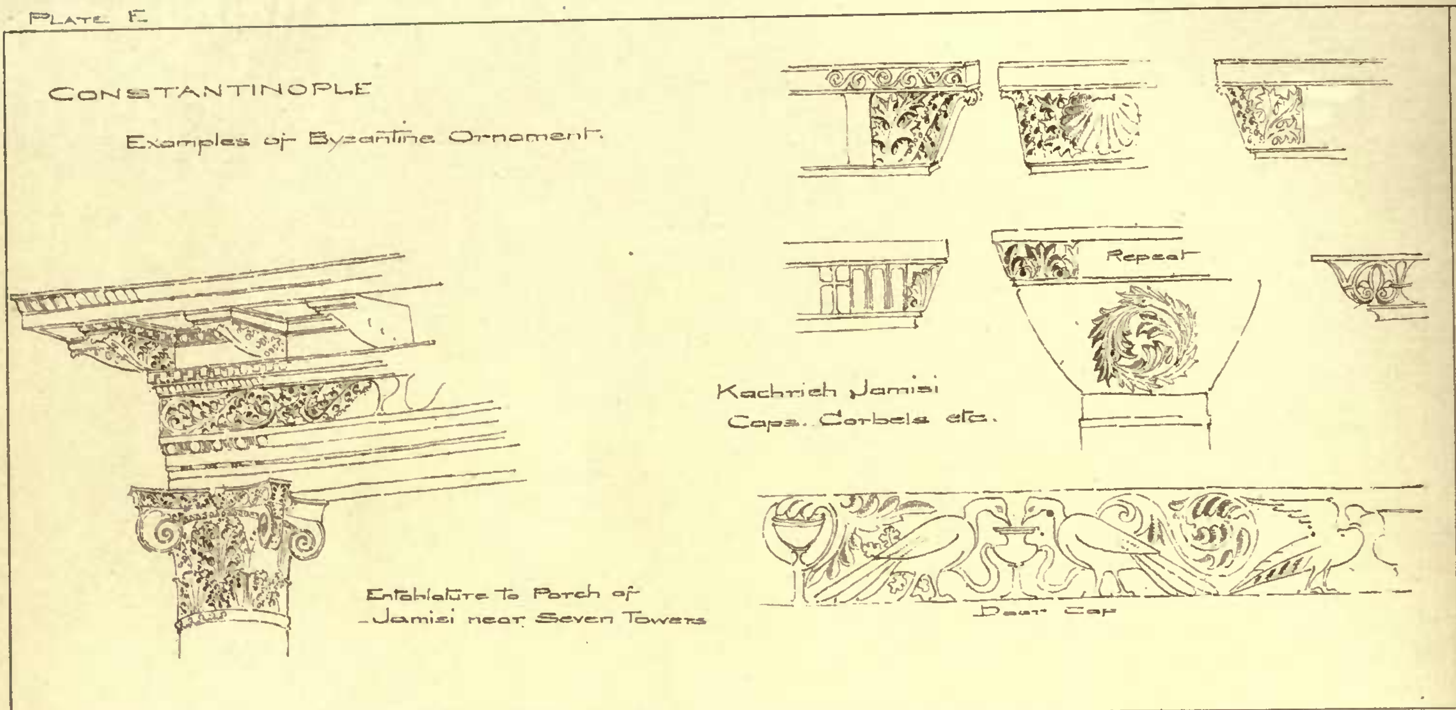


Plate F
Constantinople
Examples of Byzantine Ornament.
Entablature to Porch of
-Jamisi near Seven Towers
Kachrieh Jamisi
Caps. Corbels etc.
Repeat
Door Cap

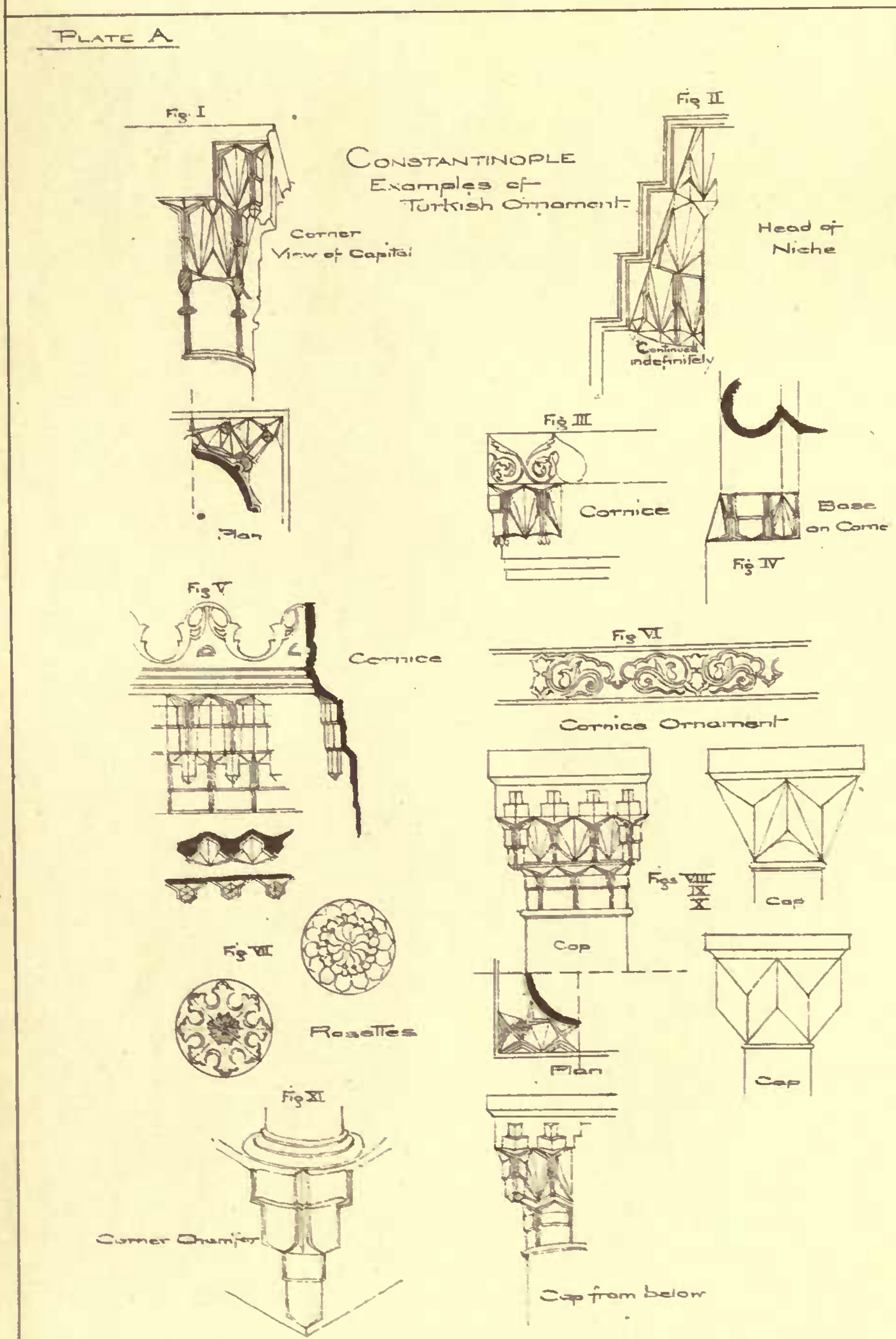


Plate A
Constantinople
Examples of
Turkish Ornament
Fig. I
Corner
View of Capital
Plan
Fig II
Head of
Niche
Continued
indefinitely
Fig III
Cornice
Base
on Cone
Fig IV
Fig V
Cornice
Fig VI
Cornice Ornament
Figs VIII IX X
Cap
Cap
Plan
Cap
Fig VII
Rosettes
Fig XI
Corner Chamfer
Cap from below

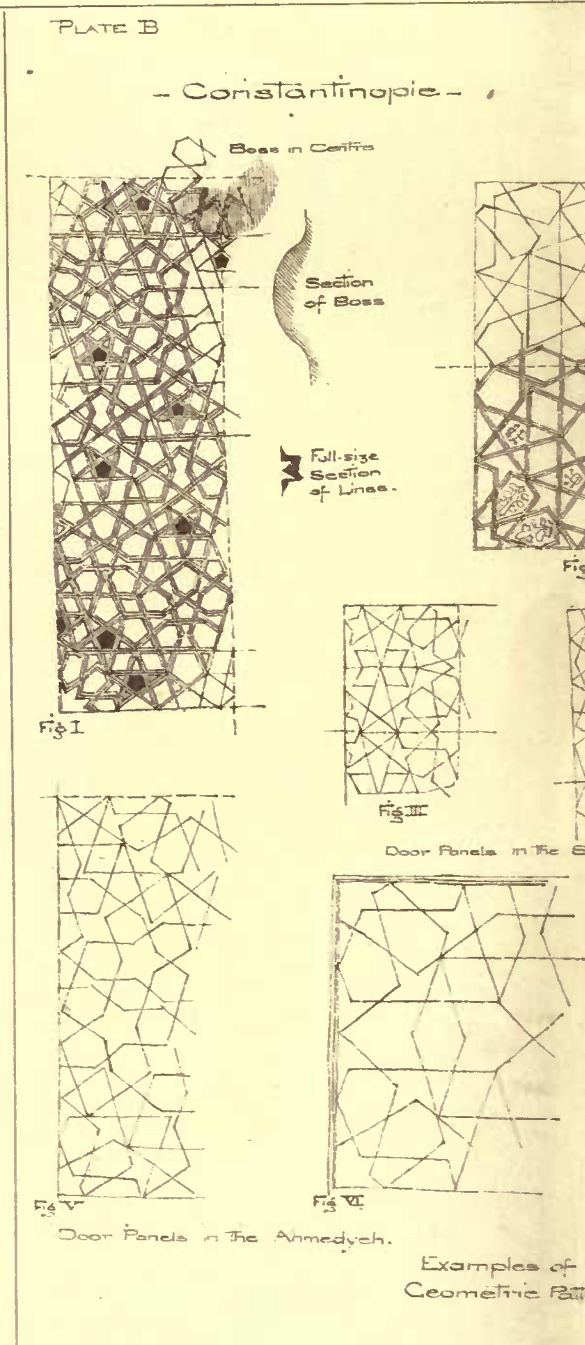


Plate B
- Constantinople -
Boss in Centre
Section
of Boss
Full-size
Section
of Lines.
Fig I
Fig III
Door Panels in the S
Fig V
Fig VI
Door Panels in the Ahmedyeh.
Examples of
Geometric Patt

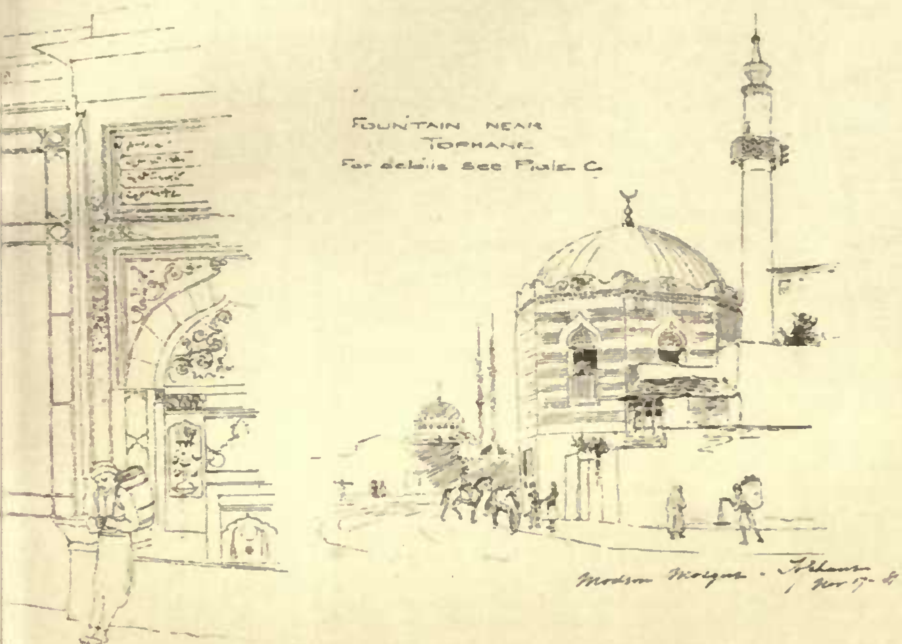


PLATE C.

CONSTANTINOPLE
Examples of Turkish Ornament.

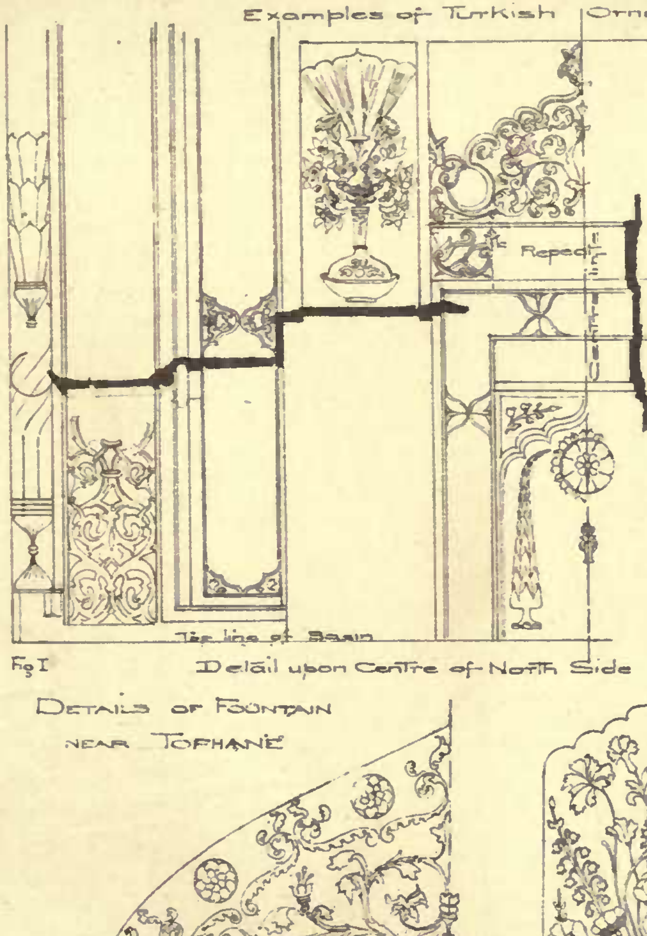


Fig I Detail upon Centre of North Side

DETAILS OF FOUNTAIN
NEAR TOPHANE

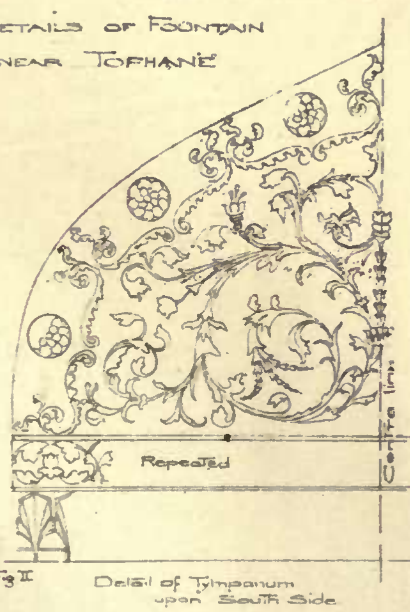


Fig II Detail of Tympanum upon South Side

Fig III Detail of Panel

CHB

PLATE D

CONSTANTINOPLE STREETS

THE ILLUSTRATIONS.

CONSTANTINOPOLITAN SKETCHES, BY MR. C. HOWARD WALKER, ARCHITECT.

For description see the first article of this issue.

COMPETITIVE [PRIZE] DESIGN FOR A $3,000-HOUSE, SUBMITTED BY "*B. S. S.*" [MR. A. W. COBB, BOSTON, MASS.]

HOUSE FOR CHARLES MILLER, ESQ., CUMMINSVILLE, CINCINNATI, O. MR. E. ANDERSON, ARCHITECT, CINCINNATI, O.

THE $3,000-HOUSE COMPETITION.—VI.

SPECIFICATIONS of materials to be furnished and used, and labor performed by contractor, in erection and completion of dwelling, according to plans furnished by "*B. S. S.*" [A. W. Cobb, Boston, Mass.], architect.

Excavation:—Excavate for cellar 8′, gross depth, below bottom of first-floor joists.

Foundations:—Build cellar-wall and underpinning of ledge-stone laid in cement-mortar up to grade, with selected field-stone as far as possible; natural fair face outside, above grade. Special care used in selection of stone for bay and outside chimney; mortar in this work to be kept back, so that stone shall have full value.

Drains:—Excavate for and lay drains, properly trapped, to sewer.

Foundations for chimneys, etc.

Chimneys:—Common brick; fireplaces, pressed-brick.

Frame to be of sound, seasoned spruce. Sizes, sills, 6″ x 8″; floorings, 2″ x 10″, 16″ on centres; studs, 2″ x 4″, etc.

Boarding of roof, walls, and under floors, hemlock.

Sheathing paper, rosin-sized, on walls and roof.

Outside Finish:—First quality seasoned pine.

Shingles:—Best sawed cedar shingles on roof; good quality sawed cedar on walls.

Gutters:—Wood; conductors, corrugated-iron, galvanized.

Windows glazed with best double-thick German glass, set in sashes 1¾″ thick, with stout muntins; frames, hard-pine; 2-inch pine plank sills; blinds.

Top Floors:—Very best selected kiln-dried spruce, mill-planed, narrow widths; hand-planed after laying. Hard-pine floor in Kitchen; oak floor in Hall of first story; hard-pine floor in Bath-room.

Inside Finish:—Door architraves plain, 4½″ wide in Kitchen and second story; simply moulded in other rooms of first story; windows ditto; door and window finish, pine, first-quality stock.

Bath-Room:—Finish about plumber's work, cherry.

Stairs:—Run from front Hall to half-way landing, oak; 6-inch, square post at bottom; balusters, three on a tread; rest of stairs pine finish; floor of half-way landing, oak, to door of back stairway.

Doors:—1¾″ thick pine, except doors of chamber closets, which will be 1½″ thick.

Mantels:—$50.00 allowed.

Plaster:—*Best* two-coat work.

Miscellaneous:—Pipe for gas; furnace adequate to heat five rooms and halls; $3.00 per door for hardware, counting sliding doors as two; concrete cellar-floor, and build coal-bins; use specially broad flashings at foot of valleys between gables.

Painting:—Stain shingles of roof and wall after they are on the building, and then oil two coats. Paint outside finish and blinds three coats of lead paint; inside finish to be stained and then given two coats shellac rubbed down, except in Kitchen and Servants' room which will have one coat of shellac. Hard-pine floors oiled two coats. Oak finish and floor of Hall to have four coats shellac filling rubbed down.

Plumbing:—Pipe of ample size and weight; soil and waste pipes carried through roof, with proper traps at sinks, etc., and air inlets; 40-gallon copper boiler; planished copper bath-tub; "Brighton" water-closet; no set bowl; hot and cold water at Kitchen sink and bath-tub.

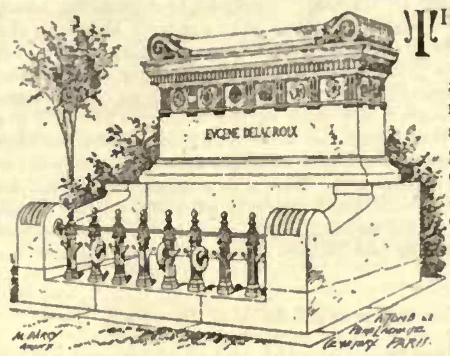
ESTIMATE OF QUANTITIES AND PRICES RULING AT BOSTON, MASS.

Item	Cost
200 cub. yds. excavating and drains	$55.00
50 perch built stone wall, including stone chimney	150.00
6 MM. bricks, laid, and N. E. Pressed-brick fireplaces,	130.00
8 " ft. framing lumber and partition stuff	112.00
7 " " hemlock covering-boards	98.00
2 " " top flooring	66.00
Hall, Kitchen and Piazza flooring	25.00
All finish-stock, including paper and flashings	175.00
5,400 sq. yds. lath and plaster, furring, etc.	180.00
19 doors with frames	75.00
34 windows, fitted, including cellar	200.00
40 MM. shingles	120.00

Item	Cost
750 lbs. nails, bolts, etc.	$40.00
Stairs	100.00
Hardware for doors	60.00
Concreting cellar and building bins	60.00
Plumbing	250.00
Bell-hanging and closet-fittings,	30.00
Mantels	50.00
Furnace	150.00
Days' labor	700.00
Painting	170.00
Total	$2,996.00
Builder's profit nominal, as very often happens	0
Architect's commission, @ 5 % (or, if working drawings only, $100.)	$150.00
Total	$3,146.00

ON THE USE OF BUILDING STONES.[1]—II.

6. *How to use Stones in the Superstructure.*



THERE are many ways of building, but whatever kind of work is adopted, whether ordinary rubble-stone, cubic stone, or ashlar, the great secret is to make every stone do its fair share. The true way of doing this is to build the walls from front to back of stone as nearly equal in thickness as possible—that is, of stones of cubic dimensions, or stones of a large area, examples of which we have in the remains of Egyptian and Cyclopean masonry. This is particularly desirable in the space between the foundation-courses, and where the face of the wall comes to be seen; good masonry is required for this, although it is often otherwise, owing perhaps to its being buried and out of sight. For the abutments of bridges or piers or viaducts, only cubic stone can be used with safety. Where a great load has to be carried, to build with cubic-stone facing and rubble-stone backing is a mistake, unless the rubble-stone is of large size and carefully bedded. With cubic stone and ordinary rubble you have in the outer face of the wall fewer beds and less mortar than in the backing, so that when the strain comes there is fracture, or a tendency for the wall to yield to the weaker side. Walls, as a rule, are much too thin to allow of the interior of a building being kept at a desirable temperature; thick walls are necessary. I would have all outer walls not less than 2 feet 6 inches, and, as applied to chimney-heads, you will never have a good draught in chimneys that are thin after passing through the roof. Unless they are thick, the current gets chilled and choked, owing to the cold, damp air it meets with from the thinness of the masonry; and, further, it leads to disfigurement, by the use of cans, cowls, and such-like contrivances, of what the architect should make one of the most telling features.

7. *How to use Stone for Coursed Work.*

The variety of this work lies more in the mode of dressing than of building. There are, for instance, hammer-dressed and nidged coursing, both done with the hammer, the difference between which has led to many disputes.

Specimens of ordinary hammer-dressed coursing may be seen on the back walls of the older buildings of the New Town, while in many of the same where modern additions have been made, nidged coursers have been used, both as different as to cost as that of ashlar and ordinary rubble-work.

There is also picked-dabbed coursing, which requires to be clearly defined, as without a specimen it may be interpreted to mean work done with the ordinary pick, which belongs to the builder; or it may mean work which can only be done by the point or pick-dabber of the hewer. But before leaving this part of my subject, I do not know that anything more valuable could be done through your Association than to have a clear and well-considered specification prepared, treating of all kinds of work. This would be certain to lessen, at least, the differences so often arising between architects and builders as to what is meant.

8. *How to Build with Ashlar-facing and Rubble Backing.*

For ordinary purposes, where there is no great load to carry, to build a substantial wall the ashlar should be well squared on the beds and joints, and laid in a good swimming bed of lime, not stones with slack beds, which the builder has to pin up to bring to the plumb, but square, well-hewn beds which will bear equally on the mortar and stones below. The builder has no excuse for not bedding them well, as with the machinery now in use, such as steam cranes and such-like appliances, he never needs to put his hand to the stone, but can at once have it lifted and rebedded without the slightest effort or trouble on his part.

A great mistake is often made in laying ashlar with too thin a bed of lime, and also jointing too closely. This may look well, but hard to hard is bad masonry, as when the pressure does come a fracture from the face is sure to follow; and I have observed buildings where the architect or clerk of works was anxious to show thin beds and close joints sadly defaced although otherwise well built, and that with the hardest of material. All ashlar-work after being backed up should have the joints well grouted with thin lime; this especially in walls that are much exposed to rain and in such a climate as ours.

The backing of ashlar, or hewn work of any kind, should be of large-sized rubble—every stone being well knocked to its bed—not simply tapped with the light hammer now in use or the edge of the trowel, but with the old-fashioned cairn hammer which every good builder had beside him on the scaffold fifty years ago.

I cannot help noticing here how different the tools which builders

[1] A Paper read at a meeting of the Edinburgh Architectural Association on the 17th ult.

now use are from what they were in the time I have referred to. Then they had a large-sized trowel with which they did not spare the mortar, and the large hammer which was freely used and never failed to bring the stone to its bed. Another tool was the hawk hammer, with one end of which the stone was squared and with the other the inequalities were dressed off. The mash and pincher, first used by the hewer forty years ago, were handy tools for bending the checks of rybats, and removing the rough along the edges of the stone. Now these, with the clourer, are part of the builder's kit, and are used by him for doing that which the older hands accomplished with the hammer — work that was not only more cheaply done, but was far more tradesmanlike in appearance. Now it is a small trowel and the lightest of hammers, which, if used, scarcely affects the stone at all. In short, the ordinary rubble building of the present day is not such as will maintain the character our Scotch masons had when I first remember.

9. *How to Dress Stone so as to get the Most Durable Surface.*

Of the various kinds of work adopted, and of which we have admirable examples in this city, I am of opinion that polished work is the best not only for securing durability to the stone, but also for bringing out the beauty of its texture and color. Hammer-dressed, nidged, pick-dabbed, broached, scabbled, droved, and tooled work all tend to bruise the surface of the stone and thus expose it to the atmosphere; while the rubbing necessary for polishing removes the bruised material, and presents to wasting agents a surface more likely to resist decay than any other kind of work I know of.

I have endeavored to make this paper as practical as possible. Its consideration may be of some value to the architectural student, as it is a matter of regret that buildings on which the architect rests his reputation, and to which his genius has been applied, should perish either from faulty stone or bad masonry.

Five hundred years ago, when those beautiful examples of Gothic architecture were erected, with their traceried windows and vaulted roofs, the architect and builder seem to have gone hand in hand not only in planning, but in building up, on true constructive principles, edifices which have withstood the ravages of time for so long a period.

Before closing, I wish to allude to a custom which prevailed when such buildings as Heriot's Hospital were erected. Then every hewer indented his mark on the face of the stone he had hewn, and it may be of interest to visit this building and observe how carefully this was adhered to. You can by these means nearly ascertain how many hewers were employed on the work, how the structure was built up round and round; and how those most expert in their craft had allotted to them the stones to dress which required the greatest skill. I have seen the same marks on buildings I have examined all over the country. I had a hobby for collecting these some years ago, and visited many of the principal cathedrals and buildings in England. I made a large collection, but unfortunately have lost the record. But it is a custom I should like to see revived, as, in my opinion, it would not deface the stone if done with the delicate and enduring touch which these old masons gave to work to which, no doubt, they attached a high value. Mark masonry, as one of the degrees in Freemasonry, had very likely something to do with the custom, but, although a Freemason myself, my paper precludes my following this phase of the craft further than to mention it as something that is at any rate suggestive.

With these examples before us, the appliances we have, and the teaching which every architectural student or working mason can get, we should be able to cope with those who have preceded us. I believe in the earnestness of the architectural student of the present day, but I am not so sure about the technical teaching or training the apprentice mason seeks after. When I first remember there were in the city many drawing-classes, chiefly attended by young men, who were either masons, carpenters, engineers, or mechanics of a like kind. There was Ruthven, on the Bridges; Milne, St. James's Square; Moffat, George Street; Paterson, Stockbridge, and others —all teaching drawing, and making good incomes from the crowded classes that attended them. Now we have such institutions as the School of Arts to take their place; but I question very much if the classes are as well attended there as the others were in the time I have referred to. Besides this, there was at every important building a drawing-class, usually conducted by the chief foreman or clerk of works, which had the effect of theoretically educating the workman to a proficiency he could not otherwise have attained. In every squad there were numbers of men who were fit, from their intelligence and training, to act as clerk of works or foreman; and, in mentioning the former, I am of opinion that the well-trained mason is better for such a trust than the joiner.

No mason or joiner can be perfect in his trade, or have his heart in it without a knowledge of drawing. As to masonry, I know of no trade that affords greater scope to the studious mind. To be proficient his head and his hands must work together. There is endless variety in the operations he has to perform, and it is far removed from work that is nearly, if not altogether, mechanical. I trust that as education (especially technical) advances, we may have a race of masons who will be something beyond mere machines, and who, by their training, will help in no small degree our architects to carry out buildings whose architecture will be worth copying even by generations to follow us.

THE WARMING AND VENTILATING OF THE ROYAL COURTS OF JUSTICE.

THE warming and ventilating of the new Courts of Justice was a subject to which the architect, the late Mr. Street, gave much thought, and it was not until several plans had been elaborated and rejected, that the existing arrangements were decided on. The scheme adopted divides the plan of the building into four nearly equal parts, by lines running at right angles through the centre of the Great Hall. To each of these is fitted a separate apparatus, the four being alike in power and construction; they are capable of working separately or together, and are arranged so as to be able to work into each other's systems. The medium employed is hot water on the low-pressure principle, circulating through pipes formed into ranges and clusters, and measuring in all a little more than eleven miles in length. The water is heated in four 50-horse-power boilers, situated in the crypt under the four angles of the Great Hall. There are two other boilers of the same dimensions for the generation of steam to be employed for the engines used for propelling air into the courts, and for heating the coils of pipes in the ventilating shafts. The scheme will thus be seen to have been arranged broadly in four divisions, all of which have been again divided into sections of high and low levels. Each section and division is connected, not with the boilers directly, but with arterial mains, which are carried round the crypt, linking the four boilers together. While the general building has been thus provided for, special attention has been bestowed upon the warming and ventilating of the courts themselves, each court being treated separately both as regards its heating and air-propelling power. Below each there is a chamber divided into two equal compartments; in one the requisite power is provided to warm and maintain the courts at a temperature of from 58° to 60° in the coldest season, with an interchange of air, equal, if necessary, to 10,000 cubic feet per minute. The other compartment is used for cold air. These two chambers merge into one, and are covered with a coarse cloth, which is used for mixing and filtering the air before it passes into the court through numerous vertical openings provided behind the wall-linings and at other convenient points. The entrance to these two compartments is under control from the lobbies of each court, so that the air driven in by fans can be passed through one or the other or partly through both, and can be tempered and mixed to suit every condition of the atmosphere. The supply of air, which in summer is calculated to reach nine and a quarter millions of cubic feet per hour, is drawn from the whole of the areas surrounding the Great Hall, and is freed from dust and smut by being passed through a fine water spray. The withdrawal of the vitiated atmosphere is accomplished by means of powerful steam coils placed in the ventilating shafts, to which access is given by numerous openings in the ceilings and galleries. Thus far the arrangements we have described have been for the purpose of warming the building. It was felt, however, that it would be necessary to cool the air in hot weather, as well as to circulate it, and for this purpose an ether refrigerating-machine has been erected in the crypt, consisting of a pair of engines, vapor-pumps, refrigerators and condenser. This machine is of sufficient power to reduce 1000 gallons of water per hour from 70° to 40° Fahr. The water thus reduced can be converted to fine spray by an "atomiser," and the air passed through it. The cold water, that is not absorbed, is collected in a cistern, and conveyed to the condenser, where it is used to abstract the heat given off by the ether in liquefying, and is finally allowed to escape at a temperature of 90°. A recording thermometer is attached to the inlet and outlet pipes of the cooler, so that the temperature of the service-water to the sprays can be adjusted to a nicety. The works have been executed by Messrs. Haden and Sons, of Trowbridge, and carried out under the supervision of Mr. Frederick Blake, of Manchester, who assisted the late Mr. Street in working out the scheme.— *Engineering.*

An Old Church in Arizona.— The most interesting of all sights is the grand old mission church of San Xavier, nine miles from Tucson, on the Papago reservation. This mission was founded in 1654, when the Papago (or Pima) Indians were supposed to have accepted the Christian religion. The church of San Xavier was begun about the year 1700 and finished in 1798, excepting one of the towers, which is yet unfinished. The style of architecture is Moorish. The lines are wonderfully perfect. It is in the form of a cross, 70 by 115 feet, and has a well formed dome. A balustrade surmounts all the walls. The front is covered with scroll-work, intricate, interesting, and partly decayed. Over the front is a life-size bust of St. Xavier. The interior is literally covered with frescoes. The altar is adorned with gilded scroll-work. The statues are as numerous as the paintings. The tiling on the floor is much defaced and but little is left. That of the roof is nearly all as perfect as when laid. Its manufacture is one of the lost arts. There is a chime of four good-sized bells in the tower that have a soft, sweet sound. Ascending to the roof, you walk up long, narrow stairs in solid walls. But one can go at a time. The same is true in going to the gallery of the church. It is marvelous that so long ago, and in such a place, such architecture, ornaments, painting, and sculpture were so well executed. You are admitted by two of the Papago signiors, who have it in charge. The admittance fee is 50 cents for each person.— *Denver Tribune.*

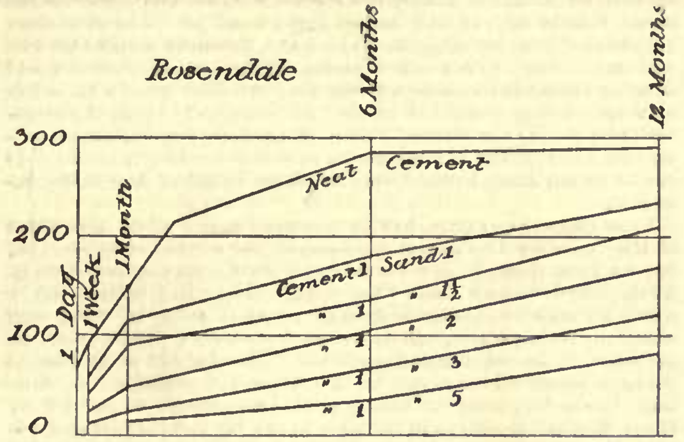
CEMENT TESTING.

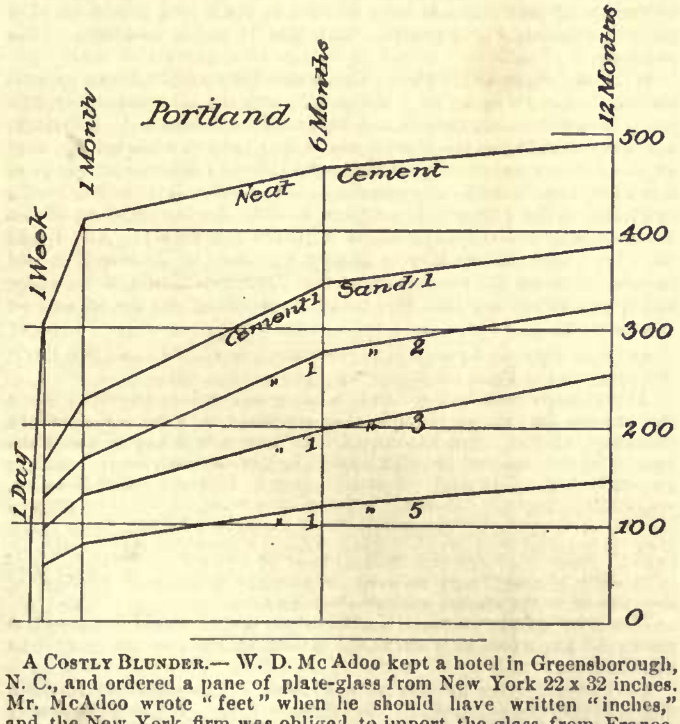
In the paper on "Cement Testing," in our issue for February 3, the following tabular statement should have been published together with the diagrams: —

CITY OF BOSTON. — IMPROVED SEWERAGE.

Average tensile strength in lbs. per square inch of Rosendale and Portland cement mortars.
Breaking section = 2¼ square inches.
Briquettes were immersed in water as soon as they would bear handling.
Sand was medium-coarse beach sand.
Fineness indicates per cent of particles retained by Nos. 50 and 120 sieves.
Nos. 50 and 120 sieves have respectively 50 and 120 meshes to a lineal inch, and 2,500 and 14,400 meshes to the square inch.
Averages are obtained from about 25,000 separate breakings in 1878-82.
Proportions were by measure, packed as in actual work.
Mortars were rammed in moulds.

Fineness.		Neat.					Cement 1. Sand 1.				Cement 1. Sand 1½.				Cement 1. Sand 2.				Cement 1. Sand 3.				Cement 1. Sand 5.			
No. 50.	No. 120.	One Day.	One Week.	One Month.	Six Months.	Twelve Months.	One Week.	One Month.	Six Months.	Twelve Months.	One Week.	One Month.	Six Months.	Twelve Months.	One Week.	One Month.	Six Months.	Twelve Months.	One Week.	One Month.	Six Months.	Twelve Months.	One Week.	One Month.	Six Months.	Twelve Months.
ROSENDALE.																										
7.3	29	71	92	145	282	290	56	116	180	236	41	90	135	210	22	49	105	169	12	25	65	121		10	36	80
PORTLAND.																										
10	30	102	303	412	468	494	160	225	347	387					126	163	279	323	95	130	198	257	55	78	116	145





A COSTLY BLUNDER.— W. D. Mc Adoo kept a hotel in Greensborough, N. C., and ordered a pane of plate-glass from New York 22 x 32 inches. Mr. McAdoo wrote "feet" when he should have written "inches," and the New York firm was obliged to import the glass from France. The enormous pane, one inch thick and 22 feet wide by 32 feet long, now lies on the wharf at Norfolk, and even if Mr. McAdoo needed it, there is no way of transporting it, as it would not pass through the cuts along the railroads nor the covered bridges. It cost $3,100.— *Exchange.*

THE OWNERSHIP OF ARCHITECTS' DRAWINGS.

THE question is evidently an unsettled one with architects how far their drawings belong, or ought to belong, to themselves. It is constantly cropping up as a grievance that the courts of law have theoretically awarded the ownership to their clients, and the decision is declared to be so unjust in practice that every available means ought to be taken to counteract its operation. As matter of fact, there is not one case in a hundred, perhaps in a thousand, in which the architect is deprived of a single scrap of his paper, either double-elephant or foolscap. On the contrary, we could quote instances in which the client has expressly refused to take the plans when offered to be delivered up to him; and we are disposed to regard these as being representative of the true public feeling. Not only so, but we are inclined to think the courts of law have really never given the decision they are supposed to have given; so that a few words of explanation may suffice to relieve the architectural mind from many misgivings.

The quarrel, it will be remembered, by which the judgment of the courts was chiefly brought out, was one which had arisen between the late Mr. Edward Barry and the Office of Public Works and Buildings, regarding the Houses of Parliament. The circumstances are worthy of being recalled in a little detail, as it will turn out that the peculiarities of the case make it altogether exceptional. The architect of the great edifice in question was, as everybody knows, Sir Charles Barry. Now there is in the English system of public administration a certain unwritten principle whereby the creator of any sufficiently important national enterprise is permitted, so long as he lives, to be its director. Witness, Sir Henry Cole, at South Kensington, who was retained in office, in spite of a whole world in arms, as the *chef de bureau* of the department he had originated, until his voluntary retirement in old age with a pension and a title. At any rate, Sir Charles Barry was no doubt regarded by the Government as the permanent surveyor of his Palace of Westminster; and, had he survived till to-day, it is scarcely possible that his command of the building operations would have been interfered with. Sir Christopher Wren, by the by, was ousted from the control of St. Paul's Cathedral; but it was probably because of a refusal to recognize the failure of his powers at an exceedingly advanced age; and, after all, the dismissal was loudly denounced as a shabby act. Sir Charles Barry, however, died at a little over sixty; and it was found that, in order to provide for his son, he had bequeathed to him in a mass the drawings of the Houses of Parliament, the possession of which would, he supposed, entitle him to the surveyorship of the building. Accordingly, young Mr. Barry entered upon the duties which his father had been accustomed to perform, and his title was in effect fully recognized by the Government. But the time came when disagreements arose, through incompatibilities of temperament if nothing more, and the Treasury was officially moved to question this title. Eventually Mr. Barry was informed that the Department of Public Works would take his duties for the future, and he was requested, therefore, to send the drawings of the building to the departmental offices for that purpose. He refused; an architect's drawings, he said, were the architect's property, and the building alone was the client's. Now if the building in question had been of an ordinary size and character, the chances are that the officials would have taken no further trouble in the matter; but the area covered by the Houses of Parliament was so large, and the intricacies of the scientific arrangement so perplexing, that the surveyors could not find their way, and consequently the Government had to apply to the ingenuity of the lawyers for assistance. The lawyers soon discovered the ground that was necessary to take up. If the architect, they said, were permitted to keep the plans of a building in these circumstances, how could his employer get at the drains? To keep the plans from him could only be intended to embarrass him intentionally in this and other similar respects; and these documents, in fact, were obviously to be regarded as the mere records or books of certain transactions of business, which an agent had in charge for his employer and must deliver up when called upon. To this argument, which any one who understands building affairs must see was a false issue — for it turned entirely upon the supposition that every drawing produced by an architect must be the record of some secret of construction — the professional leaders unfortunately made an equally fallacious rejoinder. The plans, they said, were the architect's "implements of trade," and nothing more; overlooking the fact that implements of trade are used in one piece of work after another, whereas plans are only used in one. However, the illustration of the drains bore down all opposition; parliamentary debaters and political leading-article writers denounced the selfish trickery of an order of men who laid-in people's drains, and then traded upon the concealment of them; advanced thinkers discovered that more important things than even the drains of the public were in danger, namely, their chimney-flues; and at last shrewd old judges chuckled with laughter at the joke, as they declared it to be almost as plain as the nose on a man's face that the plans of his house were as much his property as the boots on his

feet or the nails on his fingers. When lawyers laugh at their own wit it is a pretty sure sign that their logic is loose; but it can scarcely be denied that in the particular case in hand the enforced surrender of Mr. Barry's plans was an act of substantial justice. The vital peculiarity of the case of the Houses of Parliament, however, was that the plans could not be dispensed with by the officials who were to take charge of a building of such magnitude and intricacy.

But the point of law which was really decided was manifestly no more than this — that an agent must deliver up the indispensable records of his agency; whereas the fact is that the ordinary plans of an architect are not in any way such indispensable records. As regards, for example, the drains, the fallacy is so palpably absurd that it could scarcely be equalled except by quoting the chimney-flues. In most cases, perhaps, the plan of drains originally laid down has been materially modified in execution, and in no case whatever can it be said that the chimney-sweep has the slightest need for the directions of an architect's drawings. When an architect would retain plans in his hands, and refuse to allow them to be copied, for the obvious purpose of preventing another architect, who has been called in as his successor, from understanding the construction of the building, we may say at once that such an artifice is unjustifiable; but, on the other hand, to pretend that there is any practical necessity, as a general rule, for depriving a designer of the custody of those drawings of his design which have ceased to be of any value except to himself sentimentally, is equally wrong.

So far as we can judge from the precise form in which the continued protests of architects against the supposed decision of the courts are expressed, we seem to be justified in concluding that the true grievance rests upon the idea that plans which are given up to a client may be used or abused by some one else. This is a weak fancy at the best, but the influence of it may be easily understood. Indeed, it may be stated as a point of professional etiquette that a man's drawings are to be held sacred by all other men, even if only as a concession to the author's self-esteem. So far we have no doubt the courts of law would be found to support the case of the architects to the full against clients who could be proved to be animated by ungenerous motives, or even by too great a disregard of considerate and friendly feeling; but further than this it would be dangerous to go. At the same time, we submit that in ninety-nine cases out of a hundred the client cannot possibly have any reason for demanding more than a correct record of the construction of his building for practical reference; and this, it is well known, is not identical with the surrender of the drawings. A plan of the drainage, for instance, ought unquestionably to be supplied in every case of any importance; so also plans and sections of the building generally may be fairly called for, to be "put away with the papers." We ought rather to say it is *corrected copies* that ought to be supplied. But what architect would refuse these? The only question worth asking is whether the trouble of making them ought or ought not to be specially paid for? Again, the whole of the drawings ought to be held subject to a right of examination at any time by any person justly entitled to refer to them; but what architect would refuse this? On the whole, the rights and wrongs of the case are pretty well indicated by the common-sense custom, which may be called invariable, exceptions only proving the rule — namely that the architect is the custodian of his plans, and that the employer is entitled to all copies and all information he may require. And if this is common sense, it is common law. — *The Architect.*

THE YELLOWSTONE NATIONAL PARK.

Omaha, Neb., February 12, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Referring to your article in No. 371 of the *American Architect*, relating to what is known as the National Park Scheme, would you permit an architect who has, by frequent visits, become familiar among the grand scenes of the Rocky Mountains and adjacent territory, and especially the section known as the Yellowstone National Park, to give an opinion, with a reason, why no portion of the Park other than that required for buildings should be allowed to be held by any individual or corporation under an exclusive privilege, and that no railroad should ever be allowed to lay its rails within the Park limits?

The comparatively few who have visited this wonderland are universal in the jealous opinion that the entire area at present held under reservation (and to which should be added on the east a strip of thirty miles in width) should forever remain a free and unincumbered pleasure-ground uncontaminated by corporate or individual monopoly. Over an area of some four thousand square miles are scattered the grandest array of astonishing sights the world can produce.

A proper understanding of what a visitor to this section requires in order to enjoy the freedom of this grand pleasure-ground with the greatest comfort, can be easiest explained by a description of a route necessary to see its main features. Allowing that the railroad should reach and terminate on the west at or near Henry's Lake and the Targee Pass, where proper outfitting posts and hotels should be located, a short ride from here along the Madison Valley and over the mountains, fourteen miles, we reach the Fire-Hole Basin, where is now located Marshall's National Park Hotel and outfitting-post, and where suddenly opens to view a basin having an area of some seven square miles. Here should be located good hotels and outfitting-posts. From Fire-Hole Basin along the east fork of the Fire-Hole River, past Mary's Lake, Alum Creek, etc., to Yellowstone Lake, thirty-two miles, from Fire-Hole Basin to Middle Geyser Basin, four miles, and to the Upper Geyser Basin an additional eight miles, where a hotel should be located. From here to Shoshone Lake twelve miles, where a hotel should be located. From here to Yellowstone Lake *via* the Natural Bridge, fifteen miles. Following the shores of the lake twelve miles, along which hotel accommodations should be found, down the Yellowstone River past the Mud Pots, Sulphur Mountain, etc., to the Upper Falls, seventeen miles, and on to the Grotto and Falls, to the Lower Falls, one mile, in the vicinity of which hotel accommodations should be found.

Following the Grand Canyon and on to Tower Falls, Fossil Forest, Soda Butte, Specimen Mountain, etc., crossing the Yellowstone on Barnoett's Bridge, and back by Mt. Washburn to Mammoth Hot Springs, a distance, as travelled from the Lower Falls, of eighty miles, along which distance hotel accommodations should be found at least every twenty miles. At the Mammoth Hot Springs should be good hotel and outfitting accommodations, from here to Beaver Lake and Obsidian Mountain, fourteen miles, and on to Norris Geyser Basin, twelve miles, where should be located hotel accommodations, and on to Gibbon Falls, eight miles, and return to Fire-Hole Basin, ten miles. All along this route detours amounting to at least two hundred miles to see the objects of interest not on the line of travel, should be made. In granting these hotel privileges none should be exclusive and in no case should more land be leased than is required for buildings. The leasing of large tracts would effectually shut out the visitor who should travel with his own or hired conveyance from seeing these natural wonders, unless he should pay the price demanded.

At each place of interest the tourist finds good water and grass for his horses, fine camping grounds with every facility at hand necessary for comfort. In almost every case these camps are made along beautiful streams on grassy meadows with clusters of pine, firs, etc., near at hand.

Some large tracts of timber have been burned off, notably east of Fire Hole on the Madison, and between Obsidian Cliff and the Mammoth Hot Springs. The season at which these fires occur, and their location, makes it easy to detect the cause, and prescribe the cure. Should all railroad survey-parties and professional hunters be debarred from entering the Park limits, forest fires would become unknown. The tourists' camp-fire is made at a season when it would be indeed difficult to create a forest fire; the short grass with which so much of this section is covered will effectually check the camp-fire blaze during the visiting season, which is very short, not exceeding four months, and but few nights pass that are free from frost, as the ice on our camp kettle during the entire month of August demonstrated.

From close observation, having measured nearly all of the craters of the Spouting Geysers, and measured the volume of water, etc., thrown from them, I know there are no obstructions in any of them. At the Norris Geyser basin I found one spouter had in its crater a pine limb some two inches in diameter. After seeing the force with which the water, steam, and rocks are thrown from these geysers no one would believe that with the means at hand it would be possible to choke or check the force exhibited. After seeing Hell's Half Acre make one of its periodical throws, or standing in the National Park Hotel, four miles away, and feeling a heavy log building vibrate, the ingenuity of man cannot conceive of a method that would prevent these outbursts, or of a crust of sufficient strength to withhold the pressure.

What the visitor to the Park needs is several good hotels and supply-stations located somewhat as suggested. These privileges should be given to any responsible party coming well recommended, and should not in any event be controlled by a single individual or corporation, and all should be under the control of the Park Superintendent. The claim that a large and wealthy corporation could best preserve the Park from vandalism is not well taken; the time is not far distant when this pleasure-ground will be the great resort of all who can afford to visit it, and the first great aim of those in whom is invested the authority, should be to so arrange all agreements with all who are permitted to erect hotels and supply-stations, that good accommodations could be had at a fair charge, with every reasonable safeguard thrown around these franchises, that would always secure free access to all the territory within the Park limits to every proper person.

An exclusive privilege of land in any considerable quantity, much less in area than is asked for in this scheme, would place tourists at the mercy of the syndicate having the control; many of the most wonderful features of interest could not be seen without trespassing on this forbidden ground. Private parties could not procure water, grass, etc., near where their camp should be made, should such a system of leasing be permitted. The object of wishing so much land in connection with the hotel privilege can be for no other purpose than to compel visitors to patronize them, or be effectually shut out from seeing the best of its features.

That the profit on such exclusive privileges would be great is shown by the exceeding earnestness with which they are sought to be obtained.

No comment can be too unreasonable, or no criticism too plain that will retain unobstructed by monopoly privilege the Yellowstone National Park a free pleasure-ground for all time to all the world.

The running of the cars within the Park limits would detract much more from its interest as a pleasure-ground, and be much more out of place than the running of the street cars or elevated-railroad

cars into the New York Central Park, or Boston Common, or any other exclusive pleasure-ground.

The present expense and facilities for obtaining supplies we found as follows: Good outfits and provisions can be procured at Boseman, Virginia City, Dillon, Beaver Canyon, etc., also within the Park limits, at Mammoth Hot Springs and at Fire Hole Basin, the total expense for saddle-horses, spring-wagons, guide, tents, provisions, cook and cooking utensils, was five dollars and fifty cents, each, a day for a party of nine. All of the roads entering the Park, as well as those within its limits, are good; at places passing over high mountains, through beautiful parks, meadows, canyons, etc., along and across fine streams. No better or more healthful method of transportation than we found on every hand at our service could be desired. Should the railroads be allowed to pass no nearer than Henry Lake on the west, Boseman Canyon on the north, and similar locations east and south, with strict game laws to prevent professional hunters from slaughtering the game, a few trusty men under the control of the Park Superintendent would ensure to the public a model resort for pleasure at small expense. Other than building the necessary roads, bridges, etc., within the Park to obtain easy access to the points of interest, no attempt at works of art need be attempted to make a visit one of exceeding interest. Nature here has not only designed, but fully developed a grandeur that no hand of man can improve. Respectfully yours, CHARLES F. DRISCOLL.

CEMENT. — MARBLE.

March 7, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Which is preferable, cĕm'-ent or ce-mĕnt'? The dictionaries incline to the former pronunciation, but the latter is more commonly used among architects and builders.

And please inform me as to the comparative durability of Italian monumental marble and that from Vermont, notably the Middlebury white marble, when used for tombstones in the vicinity of Boston.

Yours, M. F.

[CEM'-ENT is no doubt correct, but as in many similar cases, the verbal form, accented on the last syllable, generally takes the place of the noun. The durability of Vermont marble varies extremely with the quarry. We do not know particularly about the Middlebury sort, and doubt if it has been used long enough in tombstones to give much indication of its value for such purposes. — EDS. AMERICAN ARCHITECT.]

SUBSURFACE IRRIGATION.

MINNEAPOLIS, March 8, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — In the system of disposal of sewage by subsoil irrigation, what is done in winter where the climate is such as to freeze the earth from three feet to six feet? If anything has ever been proposed to meet such a case in the *American Architect*, or by the authorities who treat of the subject it has never come to my observation, and I presume a reply in your paper will be of value to many as well as to A SUBSCRIBER.

[WE have never known the action of subsurface irrigation pipes, placed ten or twelve inches beneath the surface, to be interfered with by frost. In our own experience, which is confirmed by that of others, the pipes continue to dispose perfectly of the liquid discharged through them even when the ground is frozen four or five feet deep all around them. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

THE CONSTRUCTION OF THEATRES. — At a meeting of the Civil and Mechanical Engineers' Society held last evening, a paper was read by Mr. A. W. Tanner "On the Construction of Theatres." The great points to bear in mind in planning a theatre were, Mr. Tanner said, to transfer all operations possible in the working of a theatre to a separate building of fire-proof construction throughout, having solid division walls between the various parts of the building; convenience of access, an extra exit door to every entrance and contiguous to it; all doors to open outward; the exit doorways to be the greatest width of the whole passage; absence of steps in corridors; the use of inclined gradients of one in ten in preference; hand-rails three inches from walls; no corridor or staircase less than four feet six inches wide; an additional six inches for every hundred persons to be accommodated; increase of width of corridors, when other passages met them, by the width of each added passage; protection of structural iron-work; no workshops either above or below the auditorium; three-foot passages at the back of all the circles; separate and distinct entrances and exits from the various parts of the house, and a proportional area of 250 square feet for every 100 persons throughout the lobbies, passages, and landings. One Continental country required a provision of two exits for 300 persons, and three for 500. There should be strong wooden barriers in all spacious corridors, breaking up a possible crush, and separating the people into fifties; and strong divisions in all staircases six feet wide and over. In the form of a theatre he was in favor of the auditorium being in the shape of an ellipse, with its major axis at right angles to the stage. He would have the boxes as few in number as possible, and confined to a small space in the auditorium. The pit-goers he would accommodate in the upper parts of the house, and devote the floors to the stalls, the first circle round the same being slightly raised above the last row of stalls, and the circles constructed on cantilevers without columns. Such a house would have a light and agreeable appearance, and, he thought, would successfully meet the requirements of the present day. — *Pall Mall Gazette.*

THE ORIGINAL INVENTOR OF THE STORAGE BATTERY. — Electricians are interested at present in the discovery, in the Patent-office, of a patent issued February 26, 1861, to C. Kirchof, a New Yorker, for an electric battery which presents all the features of the storage batteries in use at the present day — lead plates immersed in acidulated water, which become coated with oxide of lead. The principle appears to be the same as that of the Planté (French) storage battery, and the storage batteries now in the market must hereafter rely upon peculiarities of construction instead of comprehensive claims. — *New York Evening Post.*

FRENCH MODESTY. — Few readers of the French journals of the scientific sort will fail to carry away a profound conviction of the modesty of the scientists across the English Channel. The gas managers of France are proposing to erect a statue to Philippe Lebon as "the inventor of gas-lighting." Already statues have been set up to Frédéric Sauvage, "the inventor of the screw-propeller," and to the Marquis Claude de Jouffroy as "the inventor of steam navigation." M. Marc Seguin is called in France "the inventor of the high-speed locomotive," and a M. Martin "the inventor of the air-brake." One of these days it will be discovered that the architect who planned out the ark for Noah was a Frenchman. — *Exchange.*

A CHICAGO MODEL PACKING HOUSE. — A packing firm recently located in Chicago, have lately completed a warehouse which has a capacity of 100,000 tierces, and in safety, strength and fire-proof properties is regarded as the most perfect packing storage-house and warehouse on the American Continent. This superb building has walls of two feet uniform thickness, a height of five stories, each floor having a sustaining power of many millions of pounds. It is divided by a massive fire-proof wall into two warehouses, "A" and "B," is equipped with three large elevators, and has a most perfect system of fire protection and fire resistance, including a permanent sheet of water eight inches in depth covering the area of the roof. — *The Spectator.*

CAST-IRON AND WROUGHT-IRON EXPOSED TO SEWAGE. — Town sewage, that is, waste-water and human excreta, does not act injuriously on iron. In the manufacturing districts of Lancashire and Yorkshire, sewage is even most extensively used for steam-boiler purposes, the boilers, however, having special arrangements for blowing out mud. Sewage does not fur the boilers, and is consequently preferred to clean but hard water. Sewage contains solutions of soap, oil, and fatty matters, which tend to protect iron. Cast-iron pipes may be jointed with Portland cement in place of lead, making, in fact, the strongest joint known. At Chatsworth, the cast-iron pipes for the Emperor Fountain are jointed with Portland cement. — *C. B. in the Journal of the Society of Arts.*

THE FORGOTTEN TUNNEL. — Mr. Aurelien Scholl has an amusing note on what he calls the "forgotten tunnel." The other Sunday, being at Brussels, he was struck by the extreme thinness of the earth covering the Braine le Comte tunnel, and wondered why the common sense of the engineers who made the line did not direct them to continue the cutting, and thus avoid a subterranean passage. The mystery was explained to him by a Mons advocate. When railways were in their veriest infancy the Belgian government sent a party of engineers over to England to acquire experience in the construction of the new iron highways, and on their return they were instructed to lay out the first railway in that enterprising little kingdom. The work was accordingly put in hand, but on its completion one of the engineers exclaimed: "Good heavens, we have forgotten the tunnel!" The consternation was general, especially when it was remembered that there was not a single line in England but could boast of a tunnel. What was to be done? Nothing but to construct the long corridor at Braine le Comte, and when it was finished the earth was put on the top. The tunnel was then, says the witty Aurelien, the glory of the line. — *Wood and Iron.*

HOW IRON FILINGS PREVENT THE USE OF THE ELECTRIC LIGHT. — A case wherein the electric light and small particles of iron and steel are the central figures of attraction has lately come to light in this city. A manufacturer who employs a large number of emery wheels in his works concluded that he ought to have an electric light, and the light was accordingly put in. To his great disappointment he found that it would not work, and as an explanation for its queer conduct, was informed that the light was all right, but the atmosphere of the shop was all wrong — there were too many iron and steel filings "a flying in the air." After several ineffectual efforts to make the light perform its functions properly, it was suggested that the generator might be "boxed" and the obnoxious filings kept at a distance. This plan was tried, but without favorable results. The generator got hot, and petitioned very forcibly and effectually for a few whiffs of fresh air. This ended the struggle and the light was taken out. The real cause of the light's failure, as we have intimated, was not due to any imperfections of its own, as it is now working satisfactorily at another shop, but is ascribable to the large amount of iron and steel filings and dust in the air of the shop in which it was so fruitlessly experimented with. The rapid travel of the armature of the generator created a suction in the air, and this, added to the magnetism of the field magnets, naturally drew all iron filings floating in the air toward and into the machine. These small particles, attaching themselves to the armature strips, were brought in contact with the electric sparks of the machine and heated sufficiently to burn out the sections of the armature. The loss of one section, of course, breaks the circuit and puts an end to further operation. Several sections were burned out in the experiments to which we allude and the folly of persisting fully demonstrated. The question now is, can the electric light be successfully employed in close proximity to emery wheels? — *Age of Steel.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

273,247. Skylight. — Adam Bickelhoupt and Geo. Bickelhoupt, New York, N. Y.

273,248. Skylight. — Adam Bickelhoupt and Geo. Bickelhoupt, New York, N. Y.

273,257. Sidewalk-Light. — Edward K. Chamberlin, Cleveland, O.

273,265. Automatic Shutter-Fastener. — Thos. J. Dotts, Reading, Pa.

273,273. Elevator. — John Greenwood, Rochester, N. Y.

273,303. Wood-Polishing Machine. — James L. Perry, Berlin, Wis.

273,323. Protecting Elevator-Shafts and their Hatchways. — D. Wheeler Swift and Henry D. Swift, Worcester, Mass.

273,327. Sash-Holder. — Samuel S. Waterhouse, Pleasantville, N. J.

273,354. Brick-Kiln. — Jno. E. Gamble, East Liverpool, Ohio.

273,355. Window Sash and Frame. — Jacob Gruninger, San Francisco, Cal.

273,385. Nail. — George H. Perkins, Philadelphia, Pa.

273,386. Fire-Escape Ladder. — Samuel J. Phreaner, Philadelphia, Pa.

273,403. Door-Latch. — William E. Sparks, New Britain, Conn.

273,419. Fire-Proof Arch and Ceiling. — Peter B. Wight, Chicago, Ill.

273,439. Privy and its Attachments. — Francis Bauer and Daniel T. Kenney, Baltimore, Md.

273,440. Carpenter's Gauge. — Wilbur F. Berry, Chicago, Ill.

273,461. Wrench. — Joseph W. Calef, North Easton, Mass.

273,499. Ash-Chute. — George A. Fisher, New York, N. Y.

273,556. Fire-Proof Structure. — Samuel Liddle, Hamilton, Nev.

273,589. Combined Chimney Ventilator and Heater. — Frank E. Ormsby, Naumburg, N. Y.

273,622. Electrical Door-Opener. — Adolph T. Smith, New York, N. Y.

273,650. Shingle-Machine. — Calvin J. Weld, Brattleborough, Vt.

273,668. Water-Closet Pan. — Patrick Connolly, Brooklyn, N. Y.

273,685. Door-Knob. — Rolin D. Huntley, Havana, N. Y.

273,687–689. Non-Conducting Covering. — Geo. Kelly, Chicago, Ill.

SUMMARY OF THE WEEK.

Baltimore.

Insurance-Building. — Mr. Chas. L. Carson, architect, is preparing drawings for the Firemen's Insurance Co., for a five-st'y and mansard building on the n e cor. of South and Second Sts. It is to be of brick, with stone and terra-cotta finish, 37' x 64', and cost $90,000.

Building Permits. — Since our last report twenty-nine permits have been granted, the more important of which are the following: —

Chris. F. Richter, 9 three-st'y brick buildings, w s Mount St., n w cor. Lorman St.; also, 5 two-st'y brick buildings, n s Lorman St., between Mount and Fulton Sts.; also, 4 two-st'y brick buildings, e s Bruce Alley, n of Lorman St.

Geo. W. Moke, 20 two-st'y brick buildings, e s Bruce Alley, between Saratoga and Mulberry Sts.

John Glenn, 10 three-st'y brick buildings, w s Carey St., n w cor. Mulberry St.

B. Thielman, 2 two-st'y brick buildings, e s Belair Ave., s of North Ave.

Jos. M. Cone, 20 three-st'y brick buildings, s s Harlem Ave., between Arlington Ave. and Schroeder St.; also, 22 three-st'y brick buildings, n s Edmondson Ave., between Arlington Ave. and Schroeder St.; also, 7 two-st'y brick buildings, e s Mount St., s of Edmondson Ave.

Rev. James Holden, three-st'y brick building, s s Chase St., s of Hillman St.

Charles Duncan, 3 two-st'y brick buildings, n s Columbia Ave., between Callender Alley and Scott St.

John Disney, two-st'y brick building, s e cor. Aisquith and Hoffman Sts.

Geo. C. Hershman, three-st'y brick building, e s Ann St., between Bank and Gough Sts.

B. F. Smith, 6 two-st'y brick buildings, e s Haubert St., between Clement St. and Fort Ave.

Jos. Turner, 7 three-st'y brick buildings, e s Madison Ave., between Laurens and Robert Sts.

M. E. Wise, two-st'y brick building, in rear of s e cor. Lexington and Liberty Sts.

Thos. F. M. Hugh, two-st'y brick building, s e cor. Warren and Henry Sts.

Boston.

Building Permits. — *Brick.* — *Cazenove St., No.* 17, Ward 11, for Maria M. Brown, five-st'y flat Hotel "Le Brun," 33' x 63'; Holmes Brothers, builders.

Marlborough St., No. 193, Ward 11, for F. W. Chandler, four-st'y flat dwell., 24' x 62'; M. C. Grant, builder.

Conant St., Ward 20, for James McCormick, four-st'y flat brewery, 69' and 71' x 40'; ell, 31' x 39'; James W. Denry, builder.

Harrison Ave., extension Hayward and Chickering Places, Ward 10, for Geo. W. Thym, four-st'y flat dwell. and stores, 22' x 60' 11": J. W. Coburn & Co., builders.

Bennett St., No. 15, *and Ash St., Nos.* 2 *to* 6, Ward 12, for Boston Dispensary, two-st'y pitch Charitable Institution, 65' 4" x 65' 8"; McKenzie & Campbell, builders.

Pleasant St., cor. South St., Ward 24, for Boston Gas Light Co., two-st'y pitch exhausting-house, 38' x 160'; two-st'y pitch purifying-house, 71' x 156'; ell, 30' x 87'; two-st'y pitch retort-house, 108' x 197' 8"; two-st'y pitch meter-house, 50' x 62'; Thomas F. Rowland, builder.

South St., No. 22, *and Linwood Pl., Nos.* 1 *to* 4, Ward 12, for W. Rice, six-st'y flat mercantile, 24' 4" x 84', and 22' x 76'; L. P. Soule, builder.

Village St., Nos. 48 *to* 50, cor. Lucas St., Ward 16, three-st'y flat veterinary establishment, 48' x 48'.

Wood. — *Mechanic Place*, near Mechanic Ave., Ward 25, for J. Frank Wadleigh, one-st'y pitch stable, 30' x 42.

Clifton Court, near N. E. R. R., Ward 20, for A. D. Gould, two-st'y hip dwell., 30' x 34'.

Brookside Ave., near Green St., Ward 23, for Joseph P. Shaw, one-st'y flat building for manufacturing purposes, 20' x 60'; Joseph P. Shaw, builder.

Evans St., near Stanton Ave., Ward 24, for Walter E. Wyman, two-st'y pitch dwell., 28' x 36'.

Berkeley Place, near Dudley St., Ward 20, for W. T. Hersey, one-st'y pitch dwell., 21' and 24' x 30'.

Story Place, Ward 23, for Mrs. James Lee, Jr., two-st'y hip dwell., 33' 6" and 39' x 39'; ell, 13' x 17'; Holmes Brothers, builders.

Rutherford Ave., cor. Mills St., Ward 4, for David Stearns, two-st'y flat stable, 20' and 23' x 43' and 51'.

Dove St., cor. Nash Court, Ward 14, for Mary A. D. Lewis, three-st'y flat dwell., 16' x 32'.

Nash Court, Nos. 7 *to* 8, for Mary A. D. Davis, 2 three-st'y flat dwells., 16' x 32'.

Lamartine St., cor. Ramond St., Ward 23, for Michael Doyle, three-st'y pitch dwell., 21' and 26' x 33' 10"; John Potton, builder.

Brooklyn.

Building Permits. — *Tompkins Ave., No.* 81, three-st'y frame double tenement, tin roof; cost, $4,350; owner, Jno. Jung, 79 Tompkins Ave.; architect, T. Engelhardt; builder, G. Loeffler.

State St., s s, 100' e Court St., three-st'y brick office and factory, gravel roof; cost, $5,000; owner and builder, Geo. Litchfield, 81 Schermerhorn St.; architect, C. Werner.

Rush St., n w s, 125' n e Wythe Ave., 2 two-st'y and basement brownstone front dwells., gravel roofs; cost, each, about $4,000; owner, R. Taylor, 111 Clymer St.; architect and builder, J. H. Devoe.

Tompkins Ave., s e cor. Madison St., three-st'y brick store and dwell.; also, on Tompkins Ave., adjoining corner, 4 two-st'y and basement brick dwells., tin roofs; cost, corner $8,000, and inside houses each $4,500; owner, Paul C. Grening, 420 Gates Ave.

Harrison Ave., No. 170, three-st'y frame double tenement, tin roof; cost, $4,000; owner, A. Lealinske, on premises; architect, T. Engelhardt; builders, G. Straub and J. Rueger.

Chicago.

Apartment-House. — The Union Club will build a six-st'y apartment-house on a lot owned by it, fronting on Dearborn Avenue.

Warehouse. — A four-st'y brick and stone building will soon be erected at the corner of Dearborn and South Water Streets, by Porter Brothers.

Houses. — Mr. William N. Linn is building a house on Michigan Ave., designed by Burnham & Root.

Mr. Charles Linderman will build a two-st'y brick house at the corner of Diversey and Halsted Streets, Lake View; cost, $6,000.

Building Permits. — R. Jourssen, two-st'y brick flats, 22' x 30', 1890 Lake St.; cost, $2,000.

Wm. Baylis, two-st'y brick flats, 21' x 49, 3228 Dearborn St.; cost, $2,700.

D. Himrod, three-st'y brick dwell., 24' x 40' Belden Ave., near Clark St.; cost, $7,000.

Union Riding Club, brick riding-school building, 72' x 150', 527 and 531 North Clark St., to cost, $22,000.

Robert Fish, three-st'y basement store and dwell., 25' x 80', 528 West Madison St.; cost, $8,000.

H. Walsh, two-st'y basement brick flats, 21' x 50', 274 North May St.; cost, $4,000.

E. B. Pease, two-st'y brick flats, 24' x 45', 375 Park Ave., to cost, $3,500.

B. Shannon, two-st'y basement brick dwell., 21' x 48, 439 Ohio St., to cost, $3,500.

F. June, four-st'y basement brick factory, 54' x 99', Lasalle and Ontario Sts.; cost, $15,000.

P. H. Rice, two-st'y brick flats, 21' x 52', 129 Walnut St.; cost, $3,400.

W. C. Carroll, two-st'y basement brick dwell., 22' x 40', 263 Burling St.; cost, $4,500.

P. H. Mathei, three-st'y basement brick dwell., 30' x 72', 250 and 252 South Halsted St.; cost, $20,000.

John Schmelz, two-st'y brick dwell., 21' x 57', 763 Van Buren St., to cost, $3,000.

David Tubins, four-st'y brick store, 25' x 99', 101 Indiana St.; cost, $20,000.

Olaf Oleson, two-st'y brick dwell., 20' x 40', 527 West North Ave.; cost, $4,000.

S. Ingebretzen, 2 two-st'y brick dwells., 24' x 48' 202 and 204 May St.; cost, $3,500.

City of Chicago, two-st'y brick police station, 20' x 56', to cost, $3,000.

A. Williams, two-st'y brick flats, 46' x 60', 327 to 341 Oakley St.; cost, $9,000.

W. Kubitska, two-st'y basement brick flats, 25' x 70', 337 North Carpenter St., to cost $3,000.

Jas. Koeller, two-st'y brick flats, 21' x 50', 292 Larrabee St.; cost, $3,000.

Wm. H. Zink, two-st'y brick dwell., 21' x 42', 3548 Forest Ave.; cost, $3,000.

H. Eisert, three-st'y brick flats, 24' x 64', 622 Wells St.; cost, $6,500.

S. Schrainek, 2 two-st'y basement brick dwells., 20' x 40', 441 Clinton St.; cost, $3,000.

Louenske & Miketynske, three-st'y brick store and flats, 25' x 90', 689 Milwaukee Ave.; cost, $7,000.

G. Fritz, two-st'y brick store and dwell., 24' x 70', 279 Taylor St.; cost, $5,000.

M. Wheeler, three-st'y basement brick store and flats, 24' x 70', 2635 Calumet Ave.; cost, $6,000.

Sears Building, 2 brick additional stories, 40' x 60', 99 and 101 East Washington St.; cost, $8,000.

H. B. Mathews, Jr., two-st'y basement brick dwell., 23' x 54', 26 Clarkson St.; cost, $3,500.

J. B. Lynch, three-st'y basement brick dwell., 25' x 60', 212 Oak St.; cost, $7,000.

Carl F. Julin, three-st'y brick dwell., 23' x 47, 170 Schiller St.; cost, $5,000.

Cincinnati.

Wages. — The limestone masons have demanded a raise in wages from $3 to $3.50 per day. It is expected that their wages will be thus advanced without any strike.

Trouble is expected between the freestone workmen and their bosses. The former demand that all hands shall be paid alike, without any regard to the skill of the workman, putting all workmen upon an equal footing. The bosses say that this is unjust to both high and low grades of men, and that they will resist to the bitter end.

Cleveland.

Asylum. — Retreat, on St. Clair St.; cost, $15,000; Samuel Lane, architect; Sayles & Co., contractors.

Foundry. — Pipe-foundry on the Lake Shore Railway, near Cass Ave., for Silas Merchant; cost, $10,000; Walter Blythe, architect; L. C. Cuttell & Jno. Gill, builders.

School-Houses. — West High School; cost, $75,000; Eisenmann & Sully, architects.

School-houses for Wards 6, 13, 15 and 17; cost, $30,000 each; Eisenmann & Sully, architects.

Houses. — Frame dwell. on Sibley St., for Andrew Dall; cost, $6,500; G. H. Smith, architect; Sayles & Co., contractors.

Frame dwell. on Sibley St., for C. B. Couch; cost, $7,400; J. M. Blackburn, architect; Sayles & Co., contractors.

Frame dwell. on South Logan St., for Phil. Morris; cost, $8,000; Walter Blythe, architect; Sayles & Co., contractors.

Dwell. on Prospect St., for Fred. Pelton; cost, $18,000; Cudell & Richardson, architects; Sayles & Co., builders.

Two dwells. on Case Ave., for C. C. Cobb; cost, $6,000 each; Coburn & Barnum, architects; Mr. Case, builder.

Dwell. on Sterling Ave., for Wm. Bingham; cost, $3,000; F. C. Bates, architect.

Dwell. on Chestnut St., for H. M. Brainard; cost, $9,000; N. P. Charlott, architect.

New York.

There is a remarkable quietness this week in architects' offices, though a number of important projects are in embryo.

Apartment-House. — For Mr. E. H. Just, an apartment-house, 50' x 80', seven stories high, is to be built on Twenty-fifth St., near Sixth Ave. The first st'y is to be brownstone, above brick with terra-cotta finish. The cost will be about $60,000. Mr. M. C. Merritt is the architect.

Extensions and alterations are to be made to Nos. 437 and 439 Sixth Ave., from designs of Messrs. D. & J. Jardine; and the same architects have planned an addition to the Five Points House of Industry.

Building Permits. — *Morton St., No.* 80, five-st'y brownstone front tenement, tin roof; cost, $14,000; owner, John A. Frey, 118 Second St.; architect, Wm. Graul; builder, Geo. B. Christianson.

Seventieth St., s s, 219' w First Ave., 4 four-st'y brownstone front tenements, tin roofs; cost, each, $15,000; owner, Jacob L. Maschke, 198 Division St.; architect, John C. Burne.

Seventieth St., s s, 224' e Third Ave., 6 four-st'y brownstone front tenements, tin roofs; cost, each, $16,000; owner, architect, etc., same as last.

First Ave., n e cor. Sixty-third St., five-st'y brick tenement and store, tin roofs; cost, $16,000; owner, Sarah E. Hinman, 43 West One Hundred and Thirty-first St.; architect, J. H. Valentine; builders, Patrick Lawlor and S. C. Staples.

First Ave., e s, 25' 5" n Sixty-third St., 3 five-st'y brick tenements and stores, tin roofs; cost, each, $15,000; owner, architect and builder, same as last.

One Hundred and Twenty-sixth St., n s, 325' e Seventh Ave., 2 three-st'y and basement brownstone front dwells., tin roofs; cost, each, $13,000; owner, Thos. Dunn, First Ave., cor. One Hundred and Sixth St.

Ave. A, s e cor. Fifty-sixth St., two-st'y brick tenement, tin roof; cost, $3,000; lessee, Peter Block, on premises; architect, A. T. Wilson; builder, Thomas Fitzgerald.

Valentine Ave., e s, 200' s Fordham Landing Road, two-st'y frame building, shingle roof; cost, $4,750; owner, Clara M. Penguet, Fordham; architect, A. C. Neuman; builders, Poole & Priker and G. W. Reeve & Son.

Fifty-eighth St., s s, 250' e Second Ave., 3 five-st'y brick and stone tenements, tin roofs; cost, each, $13,000; owner, Morris Reinhart, 648 Madison Ave.; architect, A. B. Ogden.

West Twenty-ninth St., Nos. 227 *and* 229, five-st'y brick factory, tin roof; cost, $10,000; owner, John J. Bowers, 240 West Twenty-ninth St.; architect, Jos. M. Dunn.

One Hundred and Twenty-fourth St., n s, 223' e Third Ave., 2 five-st'y brownstone front flats; tin roofs; cost, $55,000; owner, Anthony Smyth, 165 East One Hundred and Twenty-fourth St.; architects, Cleverdon & Putzel.

Lexington Ave., w s, 64' s One Hundred and Twenty-seventh St., three-st'y brick dwell., tin roof; cost, $7,000; owner, Richard P. Risden, 129 East One Hundred and Twenty-sixth St.; architect, J. H. Valentine.

One Hundred and Twenty-fifth St., n s, 285' e Sixth Ave., four-st'y brick tenement and store, tin roof; cost, $12,000; owner and builder, Wm. P. Burdsell, exr., 1960 Madison Ave.; architect, J. H. Valentine.

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THE New York *World*, which usually shows exceptional judgment and knowledge in its treatment of building matters, publishes an editorial in relation to the conduct of the Bureau of Buildings during the past year, which we think to be unintentionally unjust. Speaking of the inadequacy of the force of inspectors for the work required of them, it says: "Granted that the force is too small for the work it has to do, and that it is employed all the time in routine duties, it seems clear that the selection of the most important among the duties, some of which must be left undone, is not wisely made. It was surely as desirable the day before the burning of the Vienna theatre as the day afterwards to make sure that the appliances for putting out fires, and for securing the rapid dismissal of the audience, were sufficient in the theatres of New York," and so on. Farther on it says, "It ought not to be necessary to burn a theatre, or a hotel, or an apartment-house in order to direct official attention to the dangers of other buildings of the same class. If the chief of the Department has no power under the law to condemn structures which he may nevertheless consider unsafe, he can at least protest against the occupancy of such structures, and the most reckless tenants would scarcely run the risk of engaging and occupying apartments in a building against which the Superintendent of Buildings had formally protested as unfit for human habitation." While there is a great deal of truth in all this, it should be remembered that the Inspector of Buildings, far from being an absolute tyrant, as he is often called, is opposed whenever he exercises his discretion in matters within his province, with all the energy which selfish interest and conservatism can command; and any one who has followed the course of building cases during the past few years will remember that the opposition is in many instances successful, although the Inspector's orders may have been, as they usually are, quite justified, from the point of view of one who desires to save his fellow-citizens from danger, by the occasion which called for them. Under these circumstances it is natural, and fortunate for the people of the city, that he should seize the opportunity which a great catastrophe gives him, not for inquiring for the first time into a subject of which he was before ignorant, but for promulgating orders which he may have long contemplated, but did not venture to issue until he could be sure that the vast power of public opinion would aid him in enforcing them.

HOW essential this support is, and how unfounded is the *World's* idea that the simple protest of the Inspector will have any effect in warning the public against the buildings which he is powerless to have made secure, may be illustrated by one of the most recent cases in which his warning was given at the same time that his authority was exercised, — that of the Casino Theatre. All our readers will remember that some weeks ago the owners of this theatre, which, although occupied for representations, is unfinished, and contains an amount of temporary wood-work which may well be regarded as hazardous, were directed to place fire-escapes forthwith on the two fronts of the building, and the risk appearing imminent to the Inspector, as it did to at least one other person who visited the structure at the time, orders were given to suspend performances until the fire-escapes were ready for use. Unfortunately, although the matter excited some remark in the newspapers, no recent tragedy had terrified the public into seconding the Inspector's efforts, and his order was simply ignored. The fire-escapes which he called for were not built, or at least were not to be seen when we last noticed the building a week previous to the present writing; nor were the performances interrupted for a moment. On the contrary, they have continued to this day, before undiminished audiences, just as if the orders of the Bureau were meaningless gibberish, and as if open wooden stairs and doors of muslin stretched on frames left nothing to be desired in point of safety.

THE evidence taken at the inquest into the causes which led to the death of Mrs. Wakeman and her young daughter in the Cambridge Flats, in New York, two weeks ago, shows that the fatal fire was caused by the act of some person unknown, who, at the construction of the building, about four years ago, built the wooden header of one of the fireplaces into the party-wall in such a way that it was exposed to the heat from two warm-air pipes already in the wall and belonging to the adjoining house. The timber does not seem to have been necessarily in actual contact with the tin warm-air pipes, but the flue in which they were carried, in the manner usual in New York houses, happened to come in the framer's way, and he simply inserted the beam and left it there. The end of the header, according to the report of the Fire Marshal, was found badly charred, and seemed to have been smouldering a long time before the fire finally broke out into the air, burning off the baseboard in one of the rooms, at the same time that it made its appearance in the store-room underneath. From this place, full of combustible matter, the smoke and flame passed up the basement stairs, through a door which ought to have been shut, but of course was not, into the halls and staircases above. The whole building seems to have been of light construction, the party-walls, according to the testimony of the district inspector, being but twelve inches thick, to carry five stories. Of course, this would not be permitted under the present administration of the law, but in the good old days of accommodating inspectors the case was different. All the experts who were called upon agreed that light walls surrounded by stud-partitions, such as the one through which the fire penetrated the house, should be prohibited in buildings occupied by a number of families; and the jury, in their verdict, which censures the builder of the house, and the superintendent who approved its construction, took occasion to urge on the Legislature the passage of new laws, not only embodying this provision, but forbidding the erection of dwelling-houses of any kind more than six stories in height. It is touching to learn that in the opinion of all the expert firemen the younger lady might have saved herself, even in the midst of the smoke, by hurrying down the stairs, but so far was she from showing any disposition to desert her mother, that when found she was lying at the foot of the stairs from the fourth story, while her mother had already reached the head of the next flight below.

THE city of Cleveland, Ohio, has recently adopted a building ordinance, less detailed and minute than those of New York and Boston, but sufficiently comprehensive. Some of the provisions, where they differ from those of older building laws, show signs of having been drawn up in haste, as, for instance, in the second section, which limits the use of iron in the walls of buildings to those exceptional cases where the iron is backed with masonry, and thereby excludes from the territory included within the building limits all those constructions of wrought-iron covered with galvanized or painted sheet-metal which serve so excellent a purpose in many cases. In regard to the required thickness of walls, it is not surprising, considering the great discrepancies in the standards laid down by different statutes, and even in those which have formed a part of the same statute at different times, to see in the Cleveland ordinance a series of dimensions peculiar to itself, but it is difficult to understand the reasoning by which its framers should

have been led to see the necessity for compelling the owners of "business buildings" to make their front and rear walls as thick as the bearing walls, and to construct their interior partition-walls of the same dimensions as the rest. According to the tables given, the owner of a twenty-five-foot lot in Cleveland, who wishes to improve his property by erecting upon it a six-story building containing a store on the ground-floor and lofts over, with the stairway divided from the rooms by a brick wall, as is now very common, will hereafter be obliged to encumber the first story with walls aggregating, with the plastering on them, six feet in thickness of solid masonry, leaving him only nineteen feet of space for rental.

WE can hardly suppose that either the bricks or the workmanship of the Cleveland masons are so bad as to make so great a mass of wall necessary for sustaining a weight which two twelve-inch and one eight-inch wall of ordinary quality would carry indefinitely; and if, as is argued in New York, it is advisable to double the necessary thickness of exterior walls to prevent the possibility of heating them through by a fire on one side, this reasoning would not apply to interior partition-walls, which are, moreover, under the most favorable conditions for stability, being steadied by the floor-beams in every story. In some respects the rear walls of business buildings are under conditions similar to those of partition-walls, and although they are not so thoroughly secured in a vertical position, it is usual to regard twelve inches as a sufficient thickness for them, even where the front wall, which is usually much more weakened by openings, is sixteen or twenty inches thick, and the Cleveland table, which insists upon twenty-four inches, seems unnecessarily exacting. A clerical error has apparently been made in the eighth section, which directs that the "butt-ends of all joists, floor-beams and rafters" shall be cut on a splay of not less than four inches to the foot. This expression must refer to the ends of the beams which bear on the walls, although its natural meaning would seem to assign it to the ends of the beams which "butt" upon a girder, and which must of course be cut square. In other respects the new ordinance contains much that is to be commended. Flues for smoke are required without exception to be enclosed throughout with eight-inch brickwork; and steam-pipes are to be "properly protected," although the character of the protection is unfortunately left indefinite.

THE Committee on Street Railways of the Massachusetts Legislature is said to have resolved to report in favor of granting a charter to the Massachusetts Elevated Railway Company, which proposes to build and operate elevated railroads on the Meigs system in various parts of the State. The first line, if the Legislature should accept the report of the committee, will probably be built in Cambridge, as an experiment, and if it proves successful other lines will undoubtedly be built in the suburbs of Boston wherever the necessary permission can be obtained. The cost of a road on this system is so small in comparison with the enormous expense of constructing the New York elevated lines that it would seem to be for the interest of some, at least, of the street-car lines to join with the Meigs company in substituting its track for their own. In this way the long and unprofitable surburban routes might be extended far enough to gain a certain amount of through business, which could hardly be dealt with by the aid of horses alone, while the cost of removal of snow from the tracks in winter, which forms a heavy item of expense on such lines, would be entirely avoided.

A DEEPLY interesting account is given in the *Builder* of the experiences of a co-operative association of furniture-makers in Paris, which was formed a year ago, and has just presented its first annual report to its stockholders. It will be remembered that among the deplorable contests between capital and labor which have occurred in France in the last few years the strike of the cabinet-makers was one of the most serious, and before it was ended the trade in fine furniture had, in a great degree, left Paris to enrich the Belgian and German manufacturers. There was, therefore, when the men had succeeded in making terms for their labor, little employment for them, and the distress caused by the strike continued to be felt after it was over, almost as severely as ever. The workmen's association tried in vain to find a remedy for this state of things, but the discussions were monopolized by professional agitators, and nothing came of them. A few of the more peaceable men, however, endowed with common-sense and independence, and disposed to action rather than talk, met apart from the rest, and resolved, instead of waiting helplessly for employment, to employ themselves, and a rough plan was drawn up for a co-operative manufacturing association. A capital of fourteen thousand dollars was borrowed, and a workshop opened in the Rue du Chemin-Vert, Number 106, on the fifteenth of January, 1882. One hundred and forty members were enrolled, each holding one share of the capital stock, for which he was obliged to pay one hundred dollars, one dollar being payable upon the allotment of the share, and one dollar each month thereafter.

FOR some months little or no business came to the association. The members, however, maintained their organization, and sought work in shops outside, ten of them only keeping possession of their own premises, where they busied themselves about such small commissions as they could obtain; and at last a piece of good fortune fell to them in the shape of a government contract for some school furniture. The furniture was very simple and cheap, but other employment came at the same time, and thirty more members were called in, and set at work for their own benefit. The original regulations of the association limited the number of hours constituting a day's work to ten, but this proved quite insufficient for the zeal of men who were working for themselves, and a change was made in the by-laws, extending the day to thirteen hours. All the management of the affairs of the association is, by the constitution, entrusted to an executive committee, which appoints a director and a foreman of the shop, whose authority over the men is as complete as in any ordinary workshop, obedience to their delegated authority being, if anything, more ready and unquestioning than it would be to an outsider. In fact, the report of the association mentions a complaint of the members, on one occasion, that their foreman was not severe enough, and in general, the chief fear of the men seems to have been that they might be tempted to do inferior work. Many of them are workmen of the very best class, and in order to show their skill they have already made a number of specimen pieces, which are kept in a show-room set apart for them. To make sure of not degenerating in taste or skill, a committee of experts, consisting of two workmen in the shop and three employed outside, judges the merit of productions concerning which any doubt is expressed. Notwithstanding the difficulties which surrounded the beginning of the undertaking, and the short time during which the capital of the association was productively employed, the net profits of the year, after paying all expenses, and the wages of the men employed in the shop, amounted to thirteen hundred and fifty dollars. This is, to be sure, not a very large profit on the capital, considering that the men worked over hours to earn it, but it must be remembered that at one dollar per month the shareholders had paid in only twelve dollars each at the end of the year, so that their returns, in proportion to the sum paid in, were much larger than might at first appear. The future of the association looks so bright that plans have already been made for disposing of the surplus income which is expected. No dividends are to be paid in cash until the shareholders have fully paid for their stock, the profits being, until then, merely credited to them. After this, one-half of the net profits only is to be divided each year, the remainder being equally shared between a retiring fund for members, and a reserve fund for contingencies. A regular percentage of the income is to be reserved for replacing tools and purchasing improved machinery.

THIS is not the first association of the kind in France, and several similar ones were formed in other trades after the great strikes of 1881 and 1882, whose history we have yet to hear, although there are indications that they have generally prospered. For some reason the independence and self-control which the foundation of such bodies implies seem to be virtues natural to the French working-men, who have, moreover, a well-established reputation for that magnanimity which is willing to risk something or sacrifice something to carry out an idea. In England, although many co-operative manufacturing associations of the same sort have been formed, they have, we believe, invariably failed, the genius of the English seeming little adapted to united effort for a common end.

WATER-CLOSETS. — VI.

BUNNETT'S CLOSET. — The first closet invented with a valve which opens in a direction outward from the bowl was designed by an English engineer named Joseph Bunnett, in 1846. This closet was designed to be placed below the water-line or point of discharge.

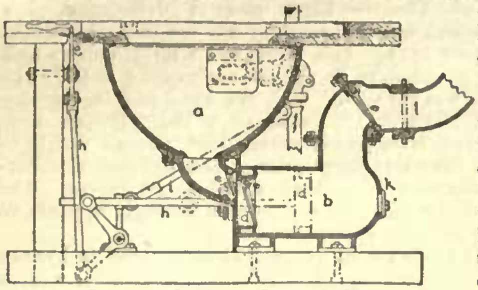

Fig. 49. — Section. — Bunnett's Closet.
a, Bowl. *b*, Piston chamber. *d*, Piston. *e*, Valves. *f*, Supply-pipe. *g*, Hand-lever. *h*, Piston-rod. *i*, Rod for operating supply-valve. *k*, Inspection-hole. *l*, Soil-pipe. *m*, Fan. *n*, Connecting-rod.

This closet appears to be simpler in its construction than the Downton closet, and for that reason would be better for the purpose which that is intended to fulfil. The outlet at the bottom of the bowl and the piston which works in the receiver both have flap-valves, which open from the bowl in an outward direction. The waste matter from the bowl will descend into the receiver by the action of gravity; thence it would be forced by the action of the piston through a third valve into the soil-pipe. The last-mentioned valve is for the purpose of preventing the return of the discharged matter into the receiver. The outlet of the soil-pipe may be carried in any direction desired. In this manner the discharge of the excreta may be governed to suit circumstances. Water-closets of this type may in rare instances become necessary; for instance, in cases where it is required to put a water-closet below the point of connection with the sewer.

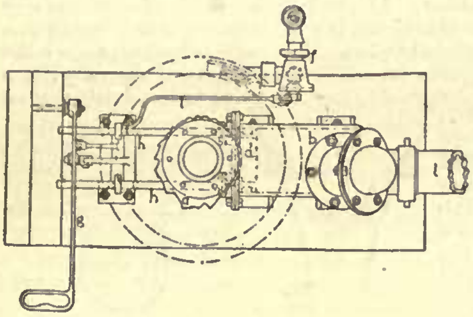

Fig. 50. — Top view. — Bunnett's Closet.

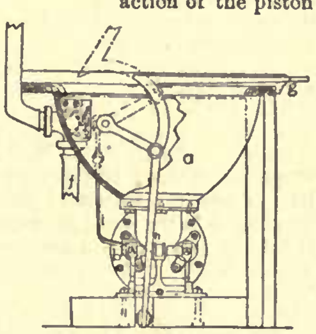

Fig. 51. Side view. — Bunnett's Closet.

When used it would be advisable to run the soil-pipe higher than its point of juncture with the sewer, so there could be no back-flow from the sewer in case the valves should leak, — and valves of this kind are liable to leak at the most inopportune time.

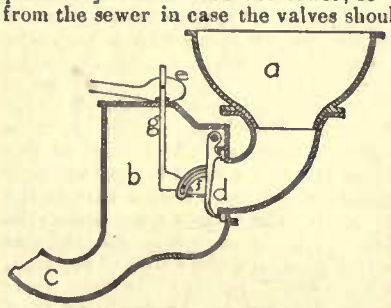

Fig. 52. — Armstrong's Closet.
a, Bowl. *b*, Receiver. *c*, Trap. *d*, Valve. *e*, Cam. *f*, Slotted quadrant. *g*, Connecting-rod.

Armstrong's Closet. — In 1848 a closet of this type and class was patented in England by John Armstrong. The novelty in this closet consists in the manner of opening the valve, by means of a slotted quadrant and cam. The valve is lifted by a cam attached to a vertical rod, the cam being bolted to the rod so that the valve will be lifted when the cam is turned on its greatest axis.

Feilding's Closet.—Another English patent was taken out for a closet, in which the valve opens outwardly, in the year 1855, by Fletcher Feilding.

There is a reservoir below the bowl that forms a water-seal trap for the overflow. This reservoir would become very filthy from deposits and stagnant water, as there is no means of flushing it. The valve has a leather washer and is lifted by means of a crank that works in a U-shaped attachment to the valve.

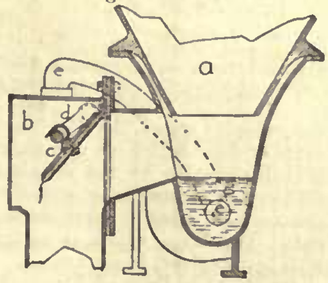

Fig. 53. — Feilding's Closet.
a, Bowl. *b*, Receiver. *c*, Valve. *d*, Crank. *e*, Overflow. *f*, Washer. *g*, Trap to overflow.

Bean's Closet. — Bean's closet, used in Scotland, may properly be classified as one of this type of valve-closets. The valve seems intended only for the purpose of retaining a large amount of water in the bowl, so that by opening the valve quickly the whole amount would be discharged suddenly into the soil-pipe, for the purpose of scouring it more thoroughly. There is an opening above the valve which is an overflow. This closet is simply a short hopper-closet with its trap, the valve being placed where the trap discharges into the soil-pipe.

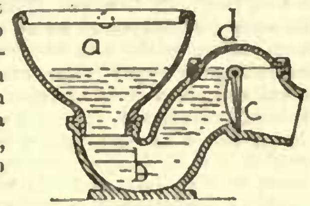

Fig. 54.— Bean's Closet.
a, Bowl. *b*, Trap. *c*, Valve. *d*, Inspection-cover.

Dummis's Closet. — M. F. Liger, in the French work on water-closets, urinals, etc., published in 1875, describes, among other closets, a valve-closet of this type, which he tells us was at that time (1875) in common use in France. This closet has a chamber or compartment at one side, very similar in appearance to the ones used in connection with plunger-closets. In this chamber there is a weight attached to the rod of the hand-pull and connected with the valve by a short hinged arm. The weight, which moves only in a vertical direction, keeps the valve pressed tightly against its seat, and unless the weight is lifted, it would be impossible for the valve to open. M. Liger says of this closet, that it is one of the best, uniting all the conditions required for health, and that it is odorless. I can see no reason why it is exempt from the faults of the class to which it belongs.

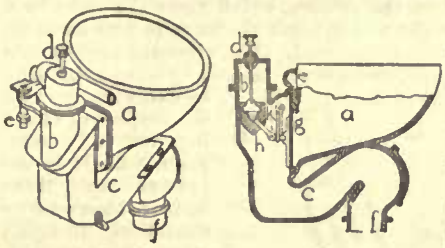

Fig. 55. Fig. 56.
Dummis's Closet.
a, Bowl. *b*, Valve-compartment. *c*, Trap. *d*, Hand-pull. *e*, Supply-pipe. *f*, Soil-pipe. *g*, Valve. *h*, Weight. *i*, Connecting-arm. *k*, Hinge.

Dummis invented, in connection with his closet, a device for separating the liquid from the solid excreta. At the point where the trap enters the soil-pipe it is divided into two branches. A grating or perforated plate is placed over the outlet nearest the closet, while a valve opening outward closes the one farthest from the closet bowl. This valve is held in position by two weighted levers. When the waste matter is discharged from the bowl, it passes through the trap, but is checked by the valve and stopped directly over the grating. The liquid matter would then pass through the perforated plate into the branch of the soil-pipe nearest the closet bowl, leaving the solid matter to be discharged into the other branch of the soil-pipe by opening the valve. This would be accomplished by raising the weighted levers on the outside. By thus dividing the liquid from the fæcal matter, its manurial qualities can be more easily utilized, and I find that the French inventors almost invariably have this point in view in making their inventions. This practice must often be a detriment to comfort by reason of the unpleasant odors generated, and to cleanliness and health, for as soon as the liquid matter is separated from solid matter, all the scouring and deodorizing qualities of water are lost. The soil-pipes must become very foul, as the solid excreta passes, in many instances, through several stories before reaching its final receptacle in a large barrel or iron can (*Fosse mobile*).

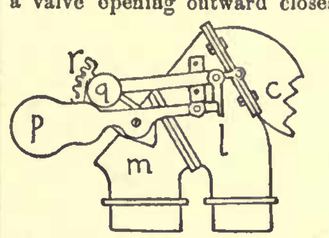

Fig. 57. Side view. — Dummis's Closet.

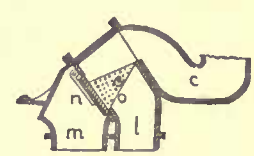

Fig. 58. Section. — Dummis's Closet.

Device for dividing liquid from solid excreta.
c, Water-closet trap. *l*, Soil-pipe for liquid matter. *m*, Soil-pipe for solid matter. *n*, Valve. *o*, Perforated plate. *p*, *q*, *r*, Combination of weights and levers for valve.

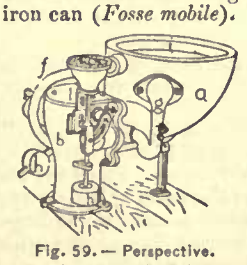

Fig. 59. — Perspective.

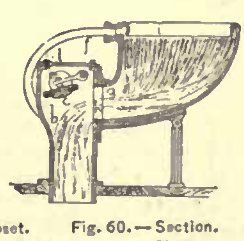

Fig. 60. — Section.

Doulton's Trapless Closet.
a, Bowl. *b*, Valve-compartment. *c*, Valve. *e*, Vent. *f*, Supply. *g*, Overflow. *h*, Weights. *i*, Flushing-rim. *k*, Valve-seat. *l*, Removable cover. *n*, Valve-crank.

Carr's Side-Outlet Valve-Closet. — W. S. Carr received letters patent in this country for a closet similar to the French closet in the arrangement of the valve and the weight which holds it in position.

Doulton's Trapless Closet. — Probably the best of this type, and I

think the best valve-closet, provided it has a siphon-trap below it, properly vented, is the "trapless" closet manufactured by Doulton & Co., Lambeth, London. This closet has a flushing-rim that gives an equal distribution of water to all parts of the bowl, by means of small holes in the rim which encircles the top of the bowl. The manufacturer says: "The construction of the closet renders the usual complication of levers, both for the supply and discharge valves, unnecessary, as both are worked from the same spindle with direct action at each end, a very small weight being necessary to render the discharge-valve tight." There is a metal rim for the valve to fit against, while the valve has a yielding substance such as rubber where it comes in contact with the seat, and an earthen face.

The overflow from the bowl to the valve-compartment is sealed by a U-trap. The bowl is furnished in different ornamental patterns and attached to an iron receiver or valve-chamber by means of bolts. The perspective view shows the simplicity of the mechanism. The hand-pull is connected to the spindle, which turns the valve by a slotted crank. The weight which holds the valve in position is attached to the lower end of the pull-rod. The valve-chamber of this closet has a large vent-pipe, and a cover held on by screws that may be easily removed for the purpose of cleaning out this compartment. It is important that these inspection-covers should fit air-tight; when once removed, they are generally put back in a careless manner, and in the case of a trapless closet this would allow free communication between the soil-pipe and the house. Doulton's closet can receive its water directly from the water-main, through his patent supply-valve; or it can be flushed from a cistern, through a pipe with an inch and a quarter diameter.

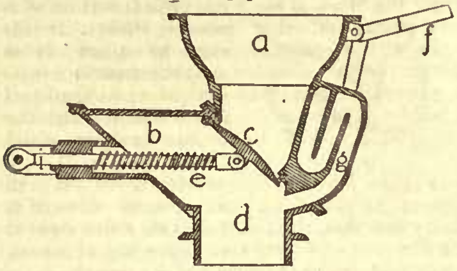

Fig. 61.— Pohley's Closet.

a, Bowl. *b*, Valve-chamber. *c*, Valve. *d*, Soil-pipe. *e*, Spring. *f*, Lever. *g*, Overflow. *i*, Rod.

Pohley's Closet.—In this country, in 1877, a valve-closet of this type was invented by F. Pohley. The valve is held in its place by a spring that encircles the rod by which the valve is drawn back or held in position. The valve, of metal, fits against a pliable band which is let into the bottom of the bowl. The valve is opened by an L-shaped lever, and the bowl has a simple siphon overflow.

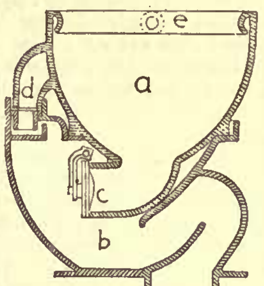

Fig. 62.—Tylor & Son's Side-outlet Valve-Closet.

a, Bowl. *b*, Trap and receiver. *c*, Valve. *d*, Overflow.

Tylor & Son's Valve-Closet.—Tylor & Son, of Newgate Street, London, invented, in 1878, a closet in which the valve opens in the same direction as the closets described above. The outlet to the bowl is at the bottom; a projection from this opening turns at right angles or forms a quarter-bend, and on the end of this projection the valve finds its seat. The overflow enters the valve-chamber immediately back of the valve, and is sealed by dipping into a box formed in the receiver. The valve with a "rubber or other suitable material, washer closes against the brass or other metal valve-seat." This valve-seat is clamped to, and made to project beyond the bowl, as shown in the detail cut.

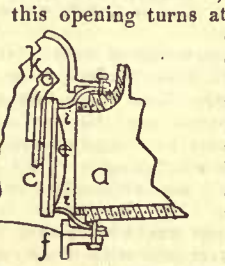

Fig. 63.—Tylor & Son's Side-outlet Valve-Closet.—Detail of valve.

a, Bowl. *c*, Valve. *e*, Earthenware face. *f*, Yielding washer. *i*, Metal seat. *k*, Spindle.

The type of valve-closets which I have last described has an advantage over other closets of this class, as well as over plunger-closets, in the position of the valve and its chamber. The waste matter passes directly into the soil-pipe without passing through the valve-chamber proper, as it does in other closets of this class, and the water does not stand in this chamber, coating it with foul deposits, as is the case in plunger-closets. With this form of closet there is very little opportunity for the back of the valve to become foul, as neither the water nor waste matter ever reaches it.

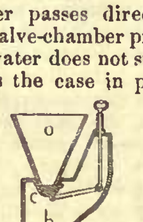

Fig. 64. Early French Valve-Closet.

a, Bowl. *b*, Receiver. *c*, Valve

At the present day Doulton & Co.'s "trapless" closet and Bean's closet are used in Great Britain, while Dummis's is used in France. There are no closets of this type manufactured in this country, and none in use, unless a small number of the English closets have been imported for parties who have been pleased with their construction.

VALVES THAT OPEN DOWNWARD.

I now come to the last type of valve-closets, and this form of the class has been in use since the beginning of the eighteenth century, with slight variations in the arrangement of their mechanism, and in the materials used in their construction. These closets, in which the valve opens in a downward direction from the bowl, have their prototype in the Bramah closet invented more than a hundred years ago. English manufacturing firms, notably Tylor & Son, Underhay, and Jennings, manufacture closets under that name at the present day. Doulton & Co. manufacture a valve very much like the Bramah, adding a weight to the end of the lever, which moves the valve, and a vent-pipe to the receiver.

Early French Valve-Closet.—Liger gives a description of a closet of this type which was first brought into use in France about the year 1823. This closet had a metal valve which was intended to fit tightly against the bowl. The valve was connected with the hand-pull in the simplest manner, by means of a short hinged arm. Judging from appearances there was no weight to keep the valve in position. The pull-rod and connecting arm were both within the receiver. The opening where the rod passed through appears to have received special attention.

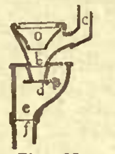

Fig. 65. Flament's Closet.

a, Bowl. *b*, 1st Receiver. *c*, Vent. *d*, Balance-valve. *e*, 2nd Receiver. *f*, Soil-pipe.

Flament's Closet.—Another closet used in France was invented by M. Flament. The bowl, with a flushing-rim, is set directly into a hopper or receiver. This hopper has a large vent, which is intended to run into a warm flue, if one is convenient; otherwise, into the outer air with a ventilating cowl on top, M. Flament designing a cowl in connection with his closet. At the bottom of this receiver, having a seat on a projection therefrom, is a balanced valve that works in a second receiver or valve-chamber. The valve is hinged, and on the side of the hinge opposite to, and forming a part of the valve, is a weighted projection that would cause the valve to rest firmly against its seat. When the first receiver has become filled or partially filled with water or excrementitious matter, the balance of the valve would be overcome and the waste matter dropped into the second receiver and soil-pipe. In the cases mentioned above, the valve is intended to keep disagreeable odors from entering the house. They are not intended to be placed over a siphon-trap.

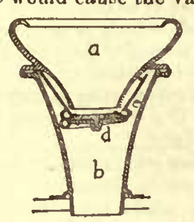

Fig. 66.

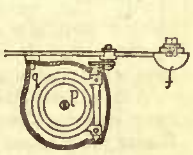

Fig. 67.

W. S. Carr's Closet.

a, Bowl. *b*, Receiver. *d*, Valve. *e*, Overflow. *f*, Lever.

The following closets are almost without a single exception in common use at the present day in different parts of the world.

Carr's Valve-Closet.—W. S. Carr, of New York, invented a simple valve-closet of this type in 1868. The bowl is set in a small hopper and the bottom of this hopper forms the valve-seat. The overflow is in the space between the hopper and bowl. The valve is held in position by a weighted lever. The inventor made some improvements on this closet in 1875, calling the improved closet the "American Defiance Closet." The novelty consisted in having the bowl and overflow made in one piece of earthenware, which is bolted to the receiver. The receiver is enamelled, and the part of the valve that shows in the bowl is also made of earthenware, closing against a rubber packing. Prof. T. M. Clark described this closet fully in his articles on Modern Plumbing. Henry Huber & Co. now manufacture this closet with an opening at the top of the overflow for a vent-pipe, and they also furnish the bowls with a vent-pipe from the closet bowl. (See *American Architect*, August 31, 1878.)

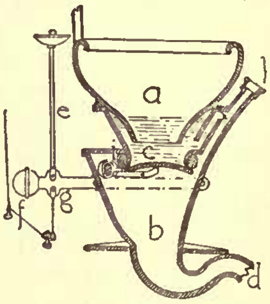

Fig. 68.—Peter's Closet.

a, Bowl. *b*, Receiver. *c*, Valve. *e*, Hand-pull. *f*, Weighted lever. *g*, Wires to tank. *h*, Vent to overflow. *i*, Rubber-ring (valve-seat) *k*, Trapped-overflow.

Peters's Closet.—Messrs. Peters & Donalds, of Glasgow, Scotland, manufacture a valve-closet in which the valve opens downward. The bowl of this closet is set in a small hopper which is placed above and forms a part of the receiver. The trap or water-seal to the overflow in this case is double, and has a vent-pipe from the crown of the trap, which would prevent the trap from being siphoned by the discharge from the bowl.

J. Bailey Denton considers this one of the best closets in use, and in describing it says: "The valve arrangement of this closet is composed of a brass disc which is closed against an india-rubber ring by means of a projecting arm cast on a spindle. By this arrangement, the patentee states, the disc is closed perfectly tight against any uneven surface which at any time may present itself. The valve is held in position by the simplest form of weighted lever, while the supply-tank is connected with the closet by means of wires and bell-cranks, motion being imparted to both at the same time by the hand-pull. The trap, which is under the floor and formed in one piece with the receiver, is not vented. Letters patent were issued for the above closet to Peters & Peters, in 1871.

Bird's-eye maple, which sells for $150 per 1,000 feet in England, is used for firewood in North Carolina.

THE ENGLISH LAW COURT BUILDINGS, OLD AND NEW.

ON the fourth of last December, in a formal leave-taking of its separated abodes in Westminster Hall and Lincoln's Inn, and in a formal entrance into the new Royal Courts of Justice, on the Strand, the ancient judiciary system of England received such fresh impulse as an outward change of vesture may exert upon the inner life. "For the first time since the Plantagenets the great mass of judicial bodies are now consolidated in a visible unity;" for the first time since the Norman kings, the sovereign will hold state in the Royal Court as the manifest head of the judicial power, the executive force, and the legislative authority. The Courts of Justice have deserted historic buildings by the change: Westminster, the noblest hall left from the great architecture of the Middle Ages, and that of Lincoln's Inn, the most perfect hall of the Renaissance, the exquisite work of the days of Elizabeth, the only remaining building where a play of Shakespeare was performed before the Queen, the Court, and the author's contemporaries.

The old Law Courts at Westminster, of which Sir Edward Coke says: "No man can tell which is the most ancient," were on the west side of the Hall; *were*, for they are now almost entirely taken down. They were ten in number, and were contained in the Italian-fronted building constructed after designs by Sir John Soane. It was in one of them, the Court of Common Pleas, that the Tichborne case was tried in 1871–1872.

Westminster Hall, from which each of the courts had an entrance, has a door on the east which forms the members' approach to the House of Commons; it leads into the fan-roofed galleries which represent the restored cloisters of 1350. The Hall, which was first built by William Rufus, as every one knows, is merged in Sir Charles Barry's huge building of the House of Parliament, or, more correctly, the New Palace of Westminster.

We find that until the reign of Queen Mary the judges rode to the Courts of Westminster on mules, and that men used to walk about the Hall seeking employment as witnesses, who unblushingly drew attention to their calling by a straw in their shoes; so that the traditional dignity of the law appears to have been preserved to us in the face of outward disadvantages. The old law buildings of Westminster were but dingy places for the Goddess of Justice to have held her court through all these years — places devoid of magnificence, grandeur, dignity, or even cleanliness, although, as the lady's attention is given with some show of interest to a pair of scales, and she is further encumbered with a bandage over her eyes, it may be presumed that she is spared a housekeeper's worry about her surroundings.

The Courts of Lincoln's Inn have been consecrated to the legal profession for five or six hundred years, but previously the spot is associated with the Earls of Lincoln and the Knights Templars. None of the buildings which remain, however, are earlier than the Tudors, the old gateway and hall having been built in the reign of Henry VII. The frontage of these ancient buildings on Chancery Lane is about five hundred feet. The gate-house is a fine specimen of late red brickwork of a Gothic type, almost the only example of the kind in London. The old hall has a monastic appearance, with its buttresses and pointed windows. In 1819 it was lengthened by ten or twelve feet, and an ugly modern ceiling was substituted for the fine, open roof of oak, which was removed, or possibly concealed.

Half a century ago there was great dissatisfaction with the administration of justice in two places at least a mile apart, and with the loss of time to judges and counsel which was involved. With a view to a remedy we find that Sir Charles Barry, as early as 1841, designed a vast building, of Grecian architecture, which was to have been erected in Lincoln's Inn Fields. It would have had a large hall about equal to Westminster Hall, round which were to have been clustered twelve smaller courts. Fortunately, however, neither funds nor public approbation assisted the plan, which would have blocked up an open space in that part of London where space is rare, "The Fields," which, although enclosed, are to the crowded district like a glimpse of the country. The subject was frequently alluded to in Parliament, but nothing was done until 1858. In that year a Royal Commission recommended a site, but Parliament threw out the bill. In 1865, however, both the site and the funds for the buildings were provided for by two Acts of Parliament, judges of designs were nominated, and a limited competition among the best architects was instituted. The designs were exhibited to the public in 1868, in a temporary building erected for the purpose, and finally the plan of Mr. George Edmund Street, R. A., was selected. Then there was a further delay, for many people, the successful architect among them, expressed the opinion that a space between the Strand and the Thames Embankment, to the east of Somerset House, would be preferable, the ground having been cleared during the preceding two years by the removal of as many as thirty close and ancient courts, alleys, lanes and yards, which had fallen into the lowest estate. The suggestion was acted upon, and thus the first brick of the "Law Courts of the Future" was laid on the last day of April, 1874, on this latter site, where the magnificent buildings now stand, on the place where lived long ago the fashion and genius of old London; where was the residence of Sir Edward Littleton, Lord Chief Justice, and near by that of the widow of Sir Walter Raleigh; where Oliver Cromwell's early days were passed; where Steele and Bolinbroke, and Pope walked in St. Clement's Lane; where scowling Swift and gentle Addison passed each other in the narrow streets; and where the pilgrims to the shrine of à Becket, at Canterbury, paused for rest at St. Clement's Well.

About eight acres were cleared: the law buildings occupy about six and a half, the remainder being left for the present an open space, which is to be laid out as a garden. The Courts are built in the Decorated or Second Pointed style, and they form a somewhat irregular square; the Strand front being four hundred and eighty-three feet, and the depth about four hundred and sixty feet. The entire pile of buildings is divided into two blocks, the eastern is the lesser one and the larger the block to the west, both fronts being relieved by dwarf towers, arches and other features, while there are two high towers, the one at the southeast angle being one hundred and seventy feet in height; so that the idea that the structure would meet the need which existed of a marked architectural feature in the long expanse of buildings between St. Paul's and Westminster, an idea which was suggested in 1869 by its late designer, will be well fulfilled.

The whole edifice is three, four and five stories in height in different parts. The general height of the building to the ridge of the roof is ninety or ninety-five feet, the Central Hall rising over the rest. This hall is one hundred and forty feet to the top of its roof, or ninety feet measured inside up to the crown of its ceiling.

There are nineteen courts, each with its own entrance and staircase, with separate approaches and doors for judges, jury, the bar, and the public, together with rooms for clerks, secretaries, and registrars, and also waiting-rooms. The Court of Appeals will have two courts: Appeal Court I, and Appeal Court II. Another will be called "The Lord Chief Justice of England's Court," in which Lord Coleridge will sit. Nine will be named "Queen's Bench Court I," II, and so on; four will be Chancery Courts and similarly numbered; two will be appropriated by the Probate, Divorce and Admiralty Courts, and the remaining one will be called "The Lord Chancellor's Court."

There are of course grumblers among the critics, who think the ventilation imperfect and who complain that the courts are ill-lighted, not to mention people who are quick to see comparison between the winding passages and the tortuous processes of the law. But whether perfect or not, the buildings are finished whose floors will be worn by the weary feet of many generations of litigants.

On Monday, the fourth of last December, these Royal Courts of Justice were formally opened by the Queen. The day was kept in London as a public holiday. The time was fixed for noon, but two hours before the judges assembled in the Prince's Chamber of the House of Lords, took breakfast together in the Peers' Dining-room, and returning to the former room they walked in stately procession, headed by the Lord Chancellor's secretaries, the mace-bearer, and other officials, robed and carrying the symbols of their office, and passing through the Division-lobby, the Peers' corridors and St. Stephen's Hall — the Lord Chancellor, the Lord Chief Justice and the Master of the Rolls singly, the others and the Law officers of the Crown two and two — they went down Westminster Hall, between the close lines of people who were standing in utter silence. It was the dignified leave-taking of that place, memorable for great interests to the subject and to the State.

At noon the Hall of the new buildings was filled with a distinguished audience. It compared unfavorably with Westminster, being less spacious, less noble, but still imposing. Its vaulted roof, its lance-head windows and its length and height suggested the nave of a cathedral. The central aisle is two hundred and thirty feet long by fifteen feet broad, down which the grand procession walked; the audience standing respectfully, their brilliant state dresses adding to the gala appearance of the Hall, which was hung with crimson.

The procession was headed by the architect and builders, and after a few officials came the Queen of England and the chief dignitaries of the kingdom. The ceremonies began punctually, the keys of the building were given and received after the usual manner; the set speeches were made; Sir William Harcourt announced that the Queen commanded him to declare the Royal Courts of Justice open. There was a flourish of trumpets, a great cheer from the people, and the event was over. The buildings were exhibited to the public from Monday, December 25, to the succeeding Friday, and sixty-three thousand two hundred and thirty-two persons visited them. The Central Hall will only be accessible on certain days in vacation, to sight-seers, hereafter.

The only change at Lincoln's Inn will be the absence of the judges; it will be left to the lawyers as it has been for centuries.

The bricks, timbers, roofs, floors, oak-wainscoting, seatings, all the materials of the shabby old law-courts of Westminster have been sold at auction, and before Parliament meets the ground on which they stood will be clear.

M. G. M.

THE WATER-COLOR EXHIBITION, NEW YORK.

IT is high praise to say that this year's exhibition was as good, even if no better, than was that of a year ago. For every one will remember how far ahead of all its predecessors was the collection of 1882. This season few drawings, perhaps, rose to an exceptional height of interest above the general average; but that average was very good — wonderfully good if we look back to a distance of even five or six years—and comparatively few essays fell painfully below it. And there were certainly some pictures that were remarkably and exceptionally fine — that would have been marked drawings in any exhibition in the world.

The hero of the hour was unquestionably Mr. Winslow Homer. For once every one whose vote told for much gave it for the same candidate. The artistic brotherhood at the preliminary reception and the newspaper men in the journals the next morning broke into a chorus of approval, and the public, having thus had a good thing pointed out to it, seemed not far behind in its appreciation. The fact is the more significant of the absolute worth of Mr. Homer's work since it had absolutely no "prettiness," and very little "charm," since it lacked, moreover, both the perfect technique, which appeals to the critical, and the anecdotal interest which attracts the popular eye. Mr. Homer has always been one of the very strongest and most original among American artists, though some times one of the most unpleasing. Versatile he has shown himself as well, and of late his changeful moods have led him in the direction of greater beauty and artistic interest. The splendid, vivid, almost infernal beauty of the numerous marine sketches he exhibited at the Water-Color show of 1881 will be long remembered. They were an immense advance upon the angular figures in raw green landscapes he had more often shown; but this year—after an extended stay in the coast countries of England — he shows himself a still completer and more powerful workman. His four pictures were no longer sketches or studies, but pictures in the truest sense of the word. Their especial excellence lay in their composition — in the linear beauty, almost statuesque in character, he gave to his rustic figures, in the way he supported these by the linear grace and strength of his landscape backgrounds — and in the dignity, and the original force and fervor with which he infused every inch of his work. His color is still most peculiar — not often attractive, though sometimes impressive, and never untruthful within the limits of the chosen scale. The color of a smooth, heaving sea under sunset light in a large marine called "Teignmouth" was, seen from a proper distance, quite beautiful. And the vigorous, stormy grays of his windy skies were superb in tone no less than in transparence and movement. Where he sinned was chiefly in his flesh tones, usually of an unpleasant purplish hue. Two pictures showed each the single figure of an English fish-wife set in a wide, cloudy, windy, savage stretch of coast land. Another was called "A Voice from the Cliffs," and showed the three-quarters-length figures of three fisher-girls listening with parted lips to some distant sound. To say that each and all were individual conceptions is implied in the fact that they were painted by Mr. Homer—for he has never at any time done a stroke which could have been credited to any other man; but their further excellence is not so easily told. It is hard to describe how these rustic figures, without being "idealized" in either form, feature, expression, or attitude, had yet been subtilely adapted to artistic purposes, so grouped, posed, and rendered as to have a linear beauty of the most rare and valuable sort. To say that Mr. Homer has gained the power to compose and draw figures which, while perfectly fresh and unstudied in effect, yet might be transferred without alteration by a sculptor to a bas-relief, is certainly to say that he is a very different Homer from the one we knew in days gone by. Yet this is not, I think, an exaggeration of the truth. It was interesting to examine the way in which this statuesque grace had been obtained—to find resulting from such an arrangement of the figure, (where more than one was in question) that the lines of one should support and almost duplicate the lines of the other, producing simplicity without monotony, harmony without rigidity. They were more than fine, these pictures of Mr. Homer's. They were powerful, both in their originality, and in the sort of dignified beauty they secured. Everything else in the rooms, almost, was killed by their strong presence — was made to look either weak, trivial, commonplace, shallow, affected or insipid. A hundred men could put on their color more skilfully than Mr. Homer. Not one had found something so new and individual to say; not one had infused his message with so much artistic force; few had been prompted by so much fervor and truly creative passion.

But it would have been hard for any one, even Mr. Homer, to take the strength out of Mr. Currier. His themes were not so interesting, and his vision not so individual. But his feeling had been as intense, and his technical work was far superior, of course, to Mr. Homer's. He sent from Munich a number of landscapes, some of them very large in size, and more in the nature of complete and balanced pictures than anything he had hitherto shown us in water-color. The sketches of moorland and of sunset skies he contributed two years ago were little more than brilliant memoranda of effects of wind, and light, and color. This year's pictures seldom sought for such gorgeous coloring or so much movement, being forest or village views pitched in a low key, the details very large in scale, but treated still in the most bold and summary way. They were immensely powerful and individual—attractive in spite of their contempt for all "prettiness," or even charm. One especially—"A Street in Schleissheim"—with a long beautifully-rendered perspective of houses and trees, and a canal toward the left, was a superb piece of work. Mr. Muhrmann is a worker in the same direction, but with a very distinct individuality of his own. His landscapes and figure studies were alike forcible and fresh. Mr. Mente, on the other hand, with similar aims, shows far less of strength and of true personality. He is a sort of diluted Currier, while Mr. Muhrmann is a colleague of Currier's who stands firmly on his own feet.

A noteworthy and promising feature of the exhibition was the greater number of figure subjects it showed — largly in excess it seemed to me, of those in any former collection. Mr. Kappes's *genre* scenes of negro life were very strong and true in character, full of humor, and good in handling and in color—quite complete in their own way. Mr. Blum was in strong contrast to the local "realism" of Mr. Kappes with his delicate, "impressionist" Venetian groups and a brilliant little dancing scene in a Spanish café. Mr. Lungren sent from Paris a number of large street views cleverly eccentric in composition. His handling is almost as free and spirited as Mr. Blum's, and he seizes a general effect with almost as much freshness and sparkle. Where he falls decidedly behind his friend is in a most vital point—in his power to give character, individuality, expression to the slightly touched little faces he portrays. In this respect Mr. Blum's talent is quite remarkable. Mr. Turner sent some large and accomplished if rather insipid groups; Mr. Chase, a very clever study of a girl in black, and Mr. Lippincott, two quite admirable studies of women's heads. In strong contrast to all this peculiarly "modern" work in which French influence is so strongly visible, were two large and careful pictures by Mrs. Stillman, who, as Miss Spartali, was formerly known as one of the most promising pupils of the Pre-Raphaelite school, under the tuition of Madox Brown. The more important of the two represented the meeting of Dante and Beatrice, and was a large drawing with a number of figures. It was interesting to some, I dare say, even in these alien days, for its own intrinsic qualities, and it was interesting to all who care anything for the history of art and its various movements and developments, because it was so entirely typical of the better products of its peculiar school. It had the usual faults and the successes which are sometimes attained but are perhaps less usual. The grouping was very good, the color ambitious and not without beauty, the handling extremely detailed yet not quite fatally labored, the drawing a little out (in the background especially) and the modelling often conspicuous by its absence. The sentimentally-sweet type of face was of course disagreeable to eyes that care for reality and strength, but to others may have seemed most charming. Such a picture looked very archaic in this year of grace 1883, and it was hard to realize how short a time it is since the Pre-Raphaelite was the youngest and most eagerly alive of all artistic schools. Mr. Newell and Mr. Smedley sent some good figure drawings of local subjects, and Mr. Abbey and his English friend, Mr. Parsons, had painted in collaboration a landscape with figures that was one of the most valuable things in the collection — a good corrective after so much Homer and Currier and Muhrmann, as showing that delicate refinement is not of necessity weakness, and that loving elaboration need not always result in confusion, or in loss of unity, of breadth or of repose. Mr. Bolton Jones taught the same lesson with almost equal grace and skill in a charming winter landscape, one of his familiar New Jersey views. Mr. Shirlaw's studies were as strong as ever and had much affinity with those of the Munich artists already mentioned. With less of strength than Mr. Currier, and less of almost aggressive individuality, Mr. Shirlaw had, perhaps, much more of charm. Mr. Tryon has a touch of poetry at his command when he does landscape work, from which the best things may eventually be hoped. Mr. Gifford and Mr. Farrer and Mr. F. S. Church are among those who deserve much more extended criticism, yet of whom I have only space to say that they were, if anything, above their usual level of interest. But Mr. Alden Weir's little flower pieces must not go unmentioned — exquisite, dainty bits of work in which the spiritual aspect of the blossoms, so to say, and not their decorative possibilities, had been insisted upon. No one but Mr. La Farge has ever painted flowers for us in just this poetic spirit, and it would indeed have been interesting could we have been given a bit of his work to put beside Mr. Weir's. The other flower subjects seemed prosaic enough by contrast — the best being the large and finely decorative studies of Miss Greatorex.

The Etching Club exhibited, as was the case last year, in connection with the Water-Color Society. Its collection was not very large but contained much interesting new work. Mr. Gifford's long, narrow plate with a Dutch windmill as the subject was to my mind the most perfect among the home productions. Mr. Platt does better month by month and perhaps he is destined, as I hear Dr. Haden predicts, — though in view of certain recent utterances we can hardly accept Dr. Haden's as a sibylline voice — to grow into the best and most original of our Americen etchers. Mr. Parrish's immense plate

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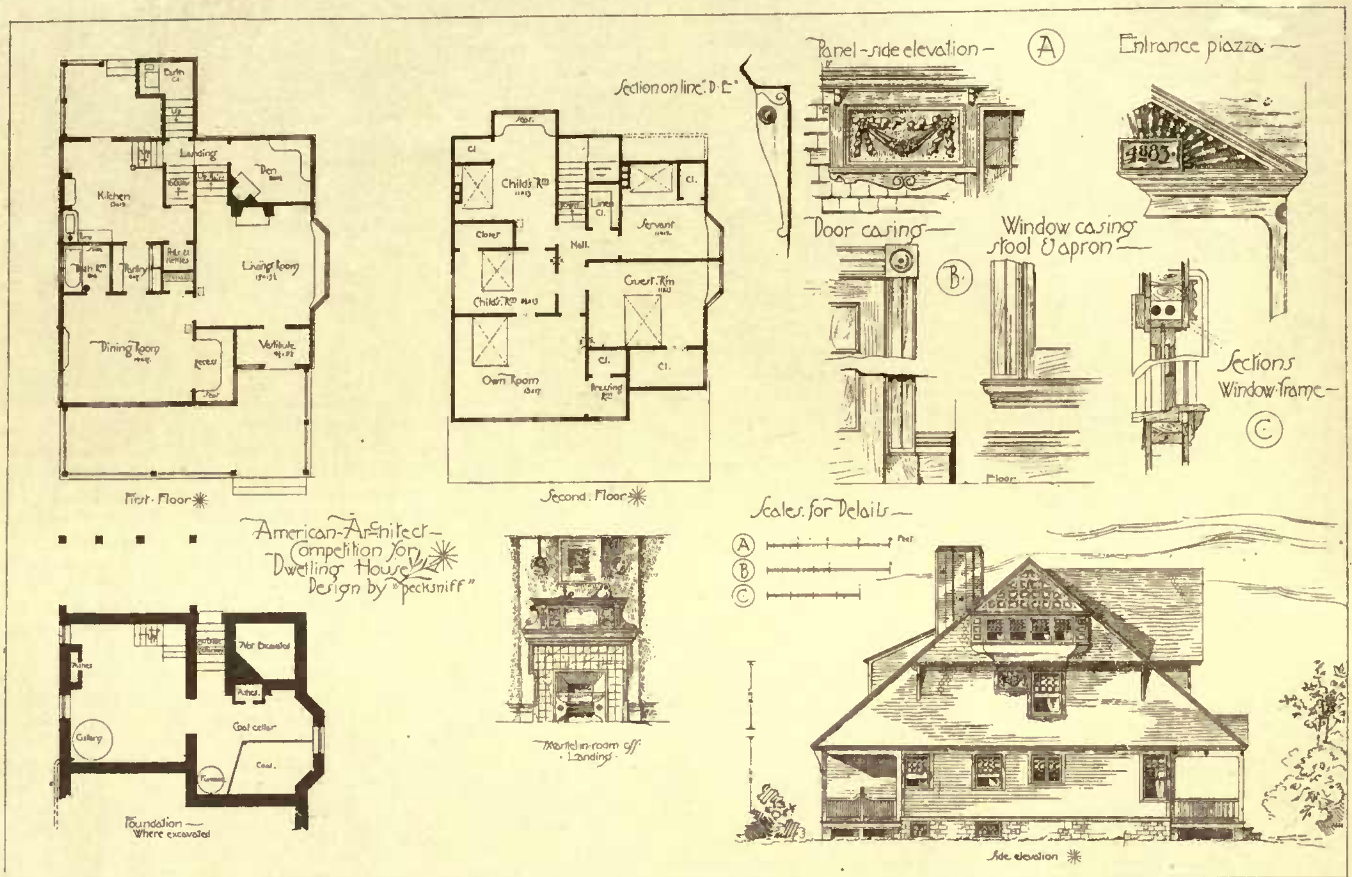

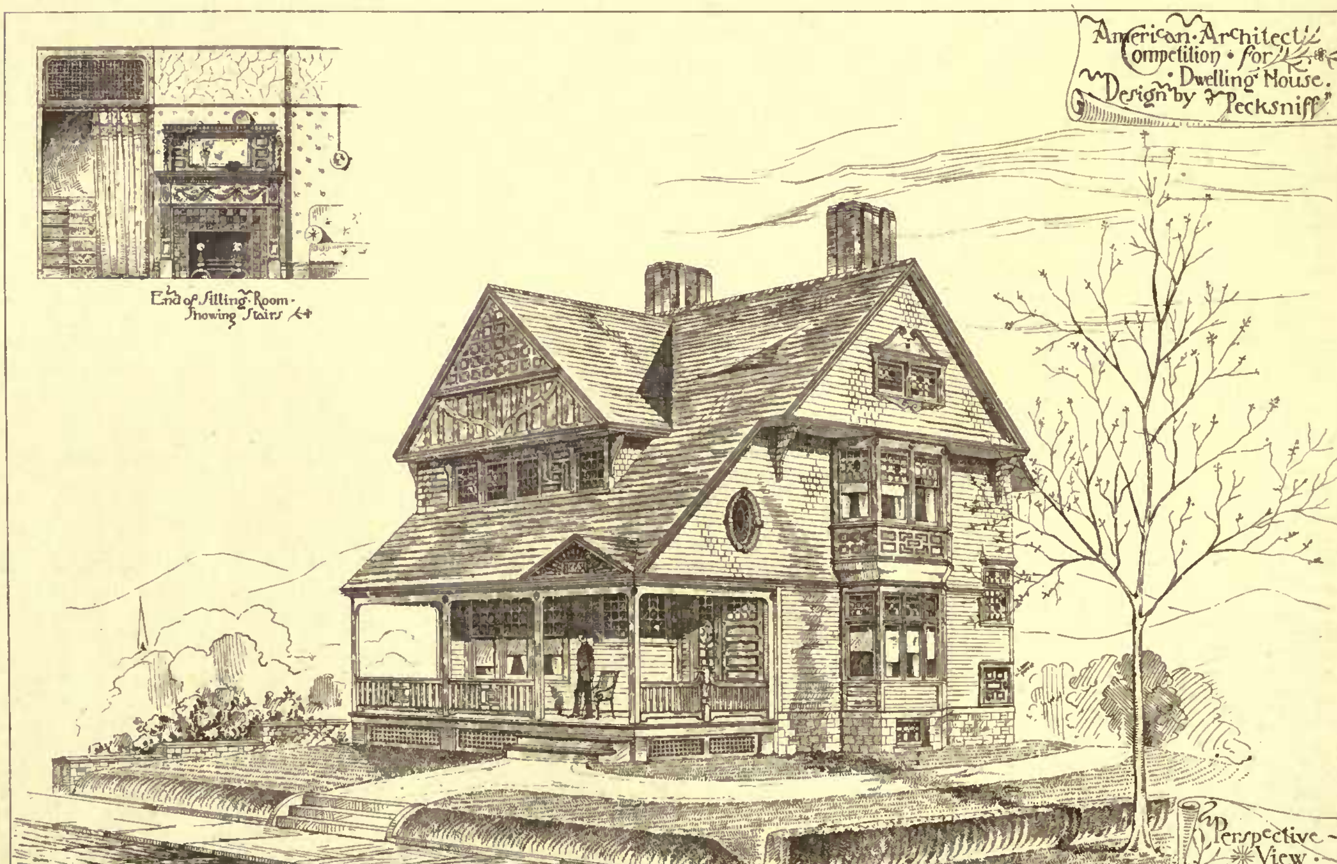

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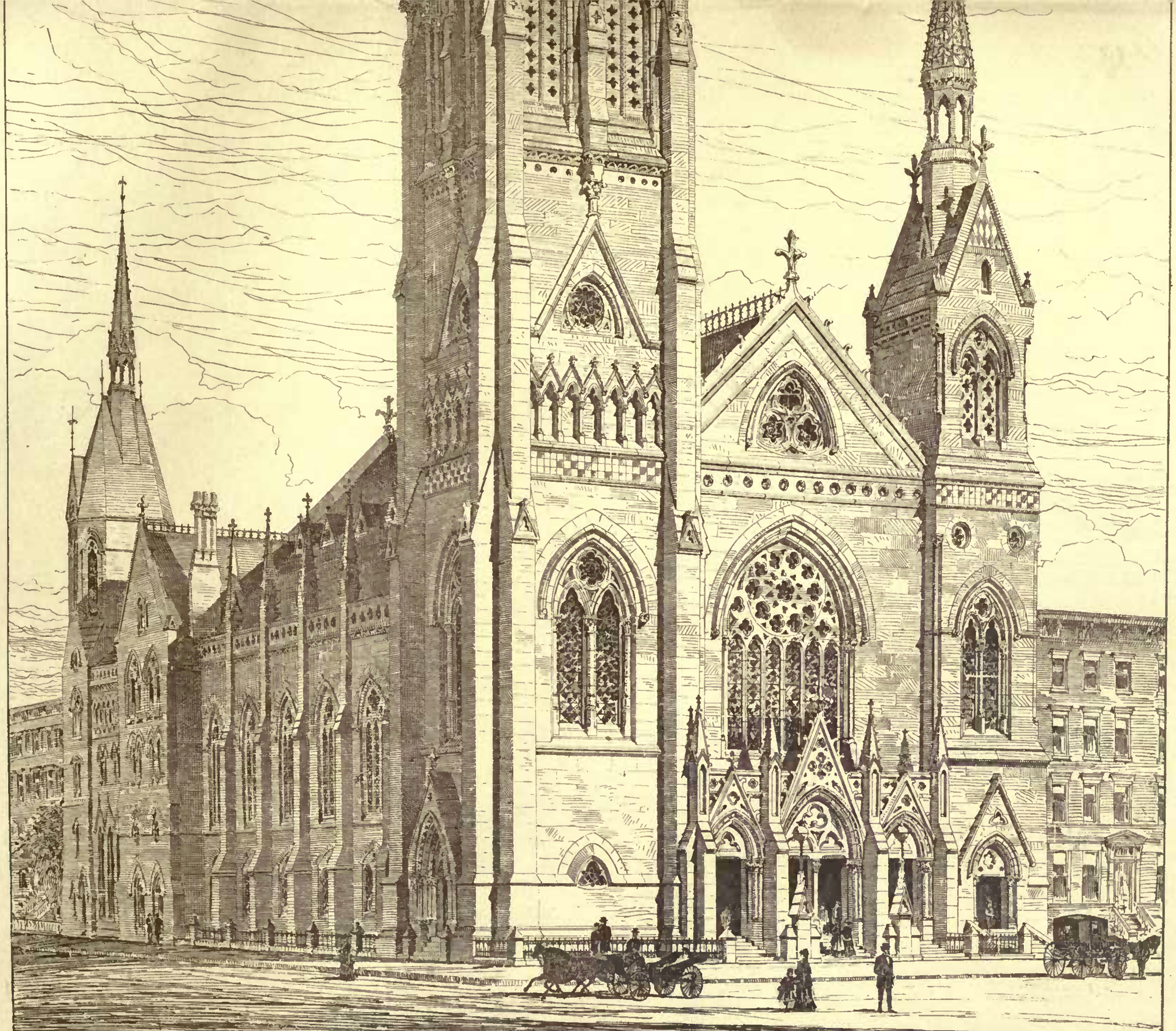

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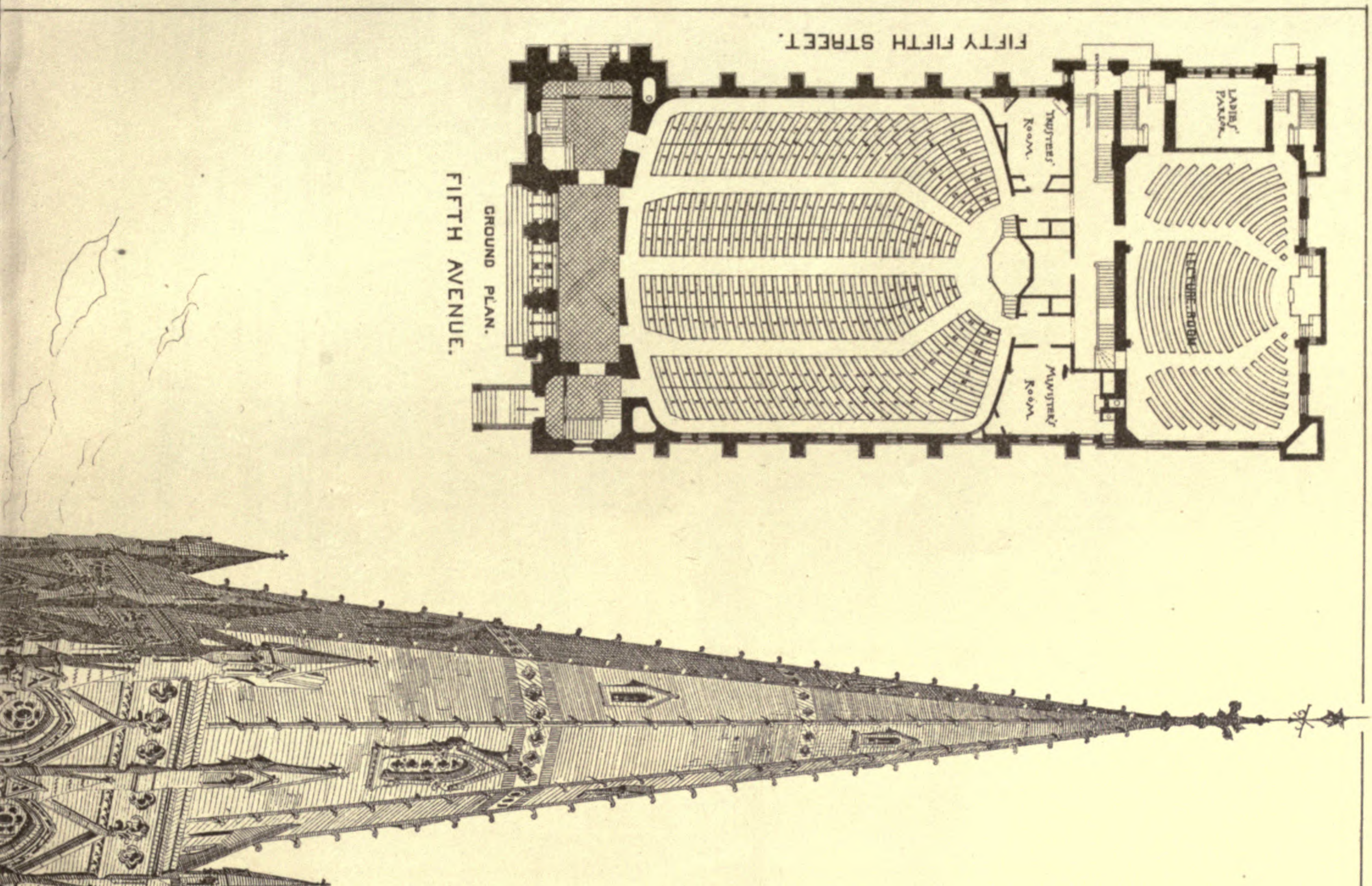
FIFTH AVENUE PRESBYTERIAN CHURCH, NEW YORK.

CARL PFEIFFER,
ARCHITECT.


FIFTY FIFTH STREET.
GROUND PLAN.
FIFTH AVENUE.
TRUSTEES' ROOM.
MINISTERS' ROOM.
LADIES' PARLOR.
LECTURE ROOM
PLAN OF GALLERY.
ORGAN PLATFORM
LADIES' PARLOR.

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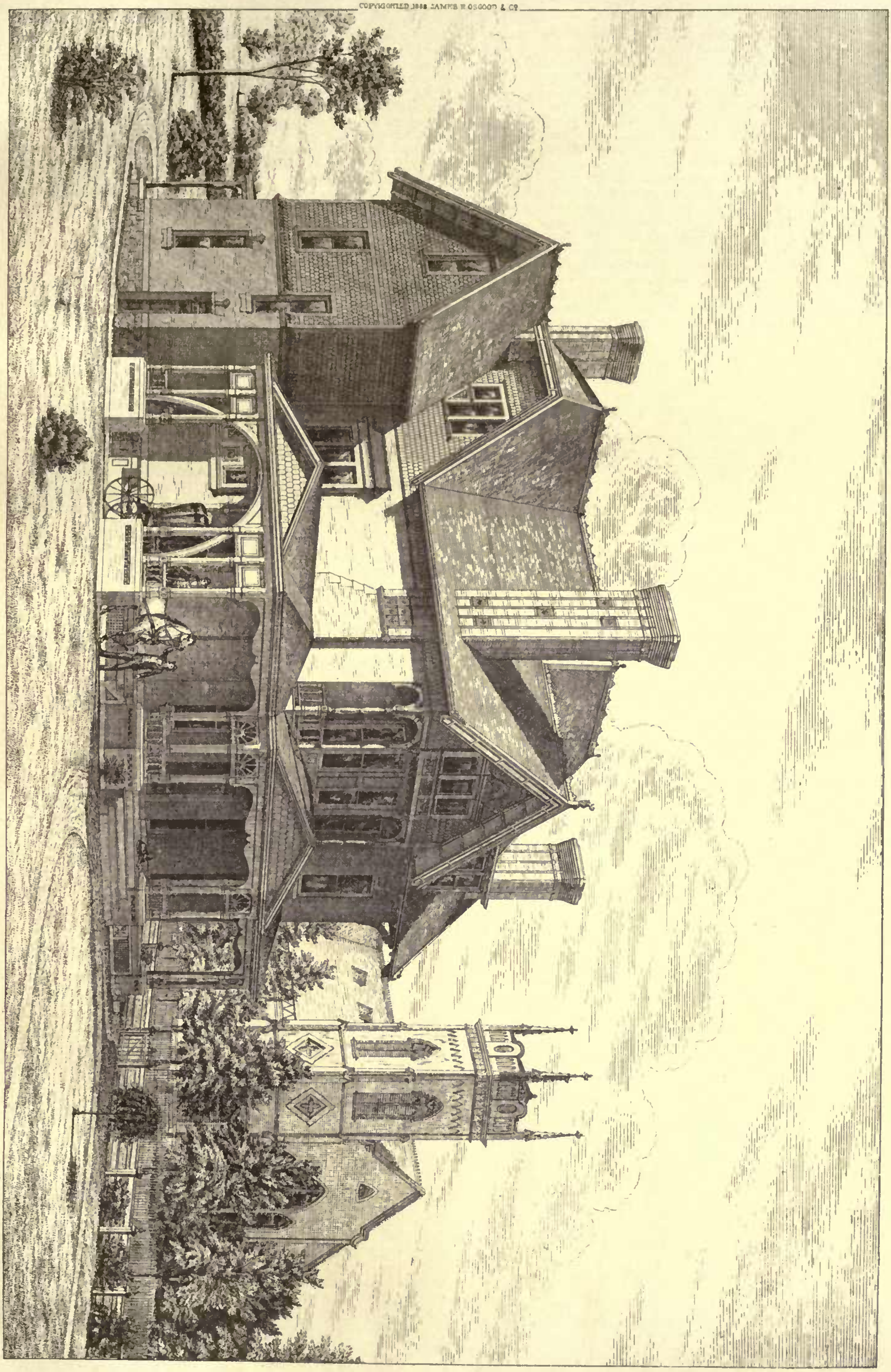


Geo. S Orth, Arch.
Pittsburgh.

Proposed Residence for Rev.d W. J. Holland.

Heliotype Printing Co. 211 Tremont S. Boston

with a scene from the New Brunswick coast was a triumph over material difficulties, but in certain artistic qualities — in composition and unity of effect for instance — was inferior to some of his works that are more moderate in size. Mr. Pennell was as charming as ever, Mr. Thomas Moran as delicately pyrotechnic in his effects of light, and Mrs. Moran, with her views in England and Wales done during the past summer, almost as strong and fascinating as in the Long Island scenes she did a year or so ago. Of course among the foreign etchings there were some by Dr. Haden, and there was also a huge plate by Haig, a view of Mont St. Michel, splendid in color and chiaroscuro, but almost too panoramic in subject to be thoroughly successful from a pictorial standpoint.

M. G. VAN RENSSELAER.

THE LATE AMERICAN ARCHITECT COMPETITION.

REPORT OF THE JURY. — II.

THE CATHEDRAL OF ATHENS.

"*BBOUL'S*" plan is remarkably like that of "*Bumpkin*," but suffers by comparison with it. The dining-room and parlor do not communicate as those of the latter do, and upstairs the chambers are too isolated, and there are no back stairs. Nevertheless, the plan is one of the best presented for a dwelling for all the year round. The attic is well utilized, and the basement fitted up for a laundry and water-closet. "*Bumpkin*" has worked-in four rooms at a little additional cost, and "*Bboul*" could probably do the same if desired. Of the elevation nothing but praise need be said. An almost quaker-like simplicity, combined with a bold accentuation of the sky-line, gives at once a refined distinction to the design, which gains much also from its excellent proportions, and from the well-balanced relation and distribution of the window openings. From the economical side this design offers a reliable solution of the problem, and could be carried out with every indication of the owner's ultimate satisfaction. The drawings are neat and pains-taking, yet with no lack of artistic sentiment. This careful drawing from a skilled hand is a pleasing contrast to the wanton neglect shown too often by facile and brilliant draughtsmen.

"*Convenience*" in plan resembles "*Danfors*," but is inferior in the arrangement of the roof and the lighting of the second-story hall. The admirably-arranged ground-plan calls for little criticism. Parlor and dining-room are made to open well together. Kitchen, china-closet, back-hall and its entrance find appropriate positions. The value of the house would, however, have gained largely, at a small additional cost, had a fireplace been put in the dining-room: it could have connected with kitchen chimney. The chief defect in the plan is the sacrifice made to obtain a striking effect by narrow slits *en échelon* upon the stairs; these, however, are quite insufficient to light the upper hall near the bath-room. An enlargement of these windows would fulfil their purpose without detracting from the merit of the exterior; this lies chiefly in an unusually broad treatment, which would at once distinguish it from more pretentious and less artistic neighbors. The drawings are carefully presented, but the side of the building in shadow should have more indications of reflected lights in the planes at right angles to each other. The honesty of the design, and the absence of all meretricious effects of rendering are a guaranty that in execution the house would not be a disappointment. The schedule is also one of the most reliable submitted. It should be noted that "*Convenience*" has falsified the relative size of his building by the tree on the left, which is on much too small a scale.

"*Oliver Twist's*" plan does not differ materially from the preceding one except that a servant's room is provided on the ground floor; this is a costly addition, the cellar and trench wall much exceeding in cost what would be required to slightly raise the main roof enough to finish an attic chamber. Two or three feet taken from the veranda would have completed the vestibule suggested, and insured further comfort in winter. The elevation is picturesque and ingeniously varied by simple devices, and the arrangement of the windows on the stairs is interesting. There is the less need of the servant's room in that there are four chambers on the second floor. A door from large to small chamber has been wisely provided. This has been very generally omitted in some of the best plans, to their loss. The drawings are presented in a sketchy way which narrowly escapes being careless. We are sorry to see that "*Oliver Twist*" rates his commission at $125. If worth anything, he is entitled to more than that.

"*Spring Chicken.*" Very good scheme; simple and economical in plan, and the exterior judiciously treated. The parlor and dining-room and kitchen grouped about the same chimney, which, however, is not made use of in the second story. The dining-room can only be reached through the parlor, which defect is mitigated by communication from kitchen to front-hall. Back stairs done away with by using the front flight, which thus cannot be left with an open balustrade into hall, but ascends between solid walls. Bedrooms well arranged, and bath-room placed properly over kitchen. Closets too large for size of house. The attic stairs, chambers, and tank disposed so that not a foot is wasted. The details are good and the drawing crisp, with, however, a dangerous tendency towards coarseness. To sum up, a capital solution of the problem from the most economical point of view.

"*Home*" (published February 3, 1883) has a good plan, which a little more study would easily raise to one of the first places in the competition. With the plainest of square plans its author has managed to group around one central chimney his parlor, dining-room, kitchen and large hall in a way which is novel and attractive. Having a vestibule, the hall could be made, even in winter, a comfortable room, and its corner fireplace and stairway give it at once a picturesque character. The free circulation in this floor is an excellent point. A good deal of thought and ingenuity is shown in the various flights of stairs, and in taking advantage of the lower stud of the kitchen. The kitchen pantry, however, is clumsily cut out of the kitchen, while upstairs valuable room is lost in getting devious access to the chambers. The stairs to the attic might be better placed to avoid the steps down into the guest room. These defects could all be remedied, and the plan would then become one of the most attractive, as it certainly now is one of the most economical. The exterior is just saved from indications of this extreme economy by its generous bay and overhanging gable. The estimates are unusually reliable, but as a bath-room may be considered a necessity, at least $100 more should be added. This competitor has boldly struck for six per cent commission, and in view of his careful study and forethought this would be no loss in the end to the owner of the house.

"*Joanna*" (see *American Architect* for February 17) is gifted with a turn of mind more practical than artistic. His plan is good, the circulation well established, and but for the inconvenience of the servant having a roundabout way to go up stairs, calls for nothing but favorable criticism. Upstairs also all goes well; there are four bedrooms and one in the attic. But it would be difficult to find an uglier elevation. From all points of view and in all details there is a determined ugliness which is startling. Gambrel roofs are most difficult to manage and here the effort to combine one with the projections and "overhangs" which belong to a lighter and more irresponsible style has been an entire failure. The gambrel's somewhat ponderous dignity presides with honor over a plain rectangular plan, but admits of no jaunty graces, and much more skill and sense of picturesqueness than "*Joanna*" shows would be required to reconcile the inharmonious elements introduced into this design. The drawings show a free and experienced touch.

It is unfortunate that "*Si quaeris*" did not respect his ideas sufficiently to treat them seriously. To the jury they seemed worthy of more honorable treatment, and anything but such contemptuous sketch-plans would have entitled their author to a prominent rank in the competition. The disposition of ground-plan is excellent; the hall large and airy for summer, and protected by a vestibule for winter; chambers equally well-disposed. The perspective is brilliantly sketched in, but without regard to the plans, apparently. The kitchen chimney disappears entirely in the second story, but reappears in a picturesque position in the perspective again. A *porte cochère* is an excellent thing — when one can pay for it — but this competitor is the only one who has ventured to show one; however as he holds his sketches cheap, he may hope to find a builder as reckless. Judging from the sketches — no elevation is vouchsafed — and by the item of $200 for mantels, this design contemplates an expenditure beyond our limits.

(*To be continued.*)

THE ILLUSTRATIONS.

FIFTH AVENUE PRESBYTERIAN CHURCH, NEW YORK, N. Y. MR. CARL PFEIFFER, ARCHITECT, NEW YORK, N. Y.

THE church is located at the northwest corner of Fifty-fifth Street and Fifth Avenue, fronting 200 feet on the former and 100 feet on the latter street. The front on Fifth Avenue is flanked by two towers varying in size, that at the southeast angle being 30 feet square at its base and rising with its spire to a height of 300 feet above the sidewalk, which is about 14 feet higher than the spire of Trinity Church. The tower at the northeast angle is 160 feet high. The main entrance, consisting of four double doorways, lies between these two towers, and is approached through a porch or narthex, 40 feet front, with stone steps leading from the court-yard on Fifth Avenue.

In addition to the main entrance there is an entrance in the northeast tower on Fifth Avenue; also in the main tower, corner of Fifty-fifth Street and Fifth Avenue, and three entrances, all double doorways, in Fifty-fifth Street, at the westerly end of church, which also afford access to the lecture and Sunday-school rooms. The ample width and number of the doorways give a ready and easy means of ingress and egress for a large congregation. The front on Fifty-fifth Street has a tower at the westerly extremity 106 feet high. There is also a tower at the northwesterly corner of the building 100 feet high, which serves as an air-shaft to supply the church with

fresh air; the air is purposely taken at the top of this tower in order to have it pure and free from dust. The principal entrances on Fifth Avenue lead into a vestibule 45 feet 7 inches long and 16 feet 6 inches wide. The ceiling is formed of groined arches, enriched with moulded ribs, foliated bosses, etc., and supported upon columns with sculptured caps. The floor of this vestibule and those in the two towers are paved with Minton's tiles. The auditorium is 100 feet deep on the main floor, 136 feet deep on the gallery, 85 feet wide, and the ceiling 60 feet high. It will have comfortable seats for two thousand persons. It has been the aim of the architect here to produce a building which should first be a perfect auditorium, based on the most scientific principles as to facility for hearing and seeing; and second, one which should be thoroughly substantial, dignified, and ecclesiastical in its architecture.

The style of the exterior is Early English, but for the interior a more modern treatment has been adopted. It has also been his object to combine with these requirements all those appliances which modern science has evoked, to meet the exigencies of the climate, and to secure for each worshipper the utmost comfort in respect to such matters as heating, lighting and ventilation. The auditorium has no sharp corners or angles, the ends being semi-circular and joined to the side walls by elliptical curves. The pews are arranged on concentric curves, all placed so as to command a direct view of the minister. The ground floor and galleries are also inclined for the same reason, following in that respect the form of the "isacoustic curve," which has been mathematically and experimentally demonstrated by Scott Russell, and other authorities, as the best form for hearing and seeing. The pulpit is of generous dimensions and of rich design; the central panel has a beautiful piece of sculpture, allegorically representing the four evangelists and the holy communion. There is a canopy over the pulpit of ornamental work, and above this the gallery for the precentor, choir, and an organ of first-class dimensions and power.

Except light iron columns to support the galleries, there are no pillars to obstruct the view. The ceiling is formed on three curves, rounded at each end to conform to the curves of the walls, and entirely constructed of wood, handsomely finished with panels, moulded groining ribs, and corbels. The lower curve of the ceiling extending a great depth down on the side walls, and the wainscoting being very high, leaves very little space for plastering. This was done to increase the acoustic properties of the auditorium.

The lighting is effected through twenty-four lofty traceried windows over, and twenty-four smaller under the galleries, and an elaborate traceried window in the east end. In addition to this, the entire upper cove of the ceiling, 35 feet wide by 75 feet deep, is filled in with stained glass and lighted from the roof by skylights. The ceiling and windows are glazed with the best quality of rolled cathedral glass. All the windows have double sashes, an inner and outer one, so as to secure complete immunity from external sounds, and also affording an opportunity of lighting the church in the evening by means of gas-lights placed between the two sashes and illuminating the stained glass so as to be seen from the inside. The space between the two sashes forms a large ventilating flue, drawing the air from the church through the perforated panels of the wainscoting, the current being increased by the heat from the gas-burners within the space.

There are pews for deaf people, arranged with rubber tubes that can be applied to the ear and connected with tin tubes extending under the floor to a hollow box forming the front of the pulpit, and, the top or book-board being perforated, the voice of the minister is easily conveyed to these pews.

The arrangement of the gas-burners and the general system of lighting deserves particular mention, as it is the first known instance where it has been attempted. Every gas-burner is hidden from view by ornamental glass-work, giving a pleasant light, and enclosed and provided with ventilating flues, so that the combustion cannot vitiate the air of the auditorium. This will be better appreciated when it is considered that the eight hundred gas-burners in the church would vitiate the air as much as four thousand people by their exhalation, thus leaving only proper ventilation to be provided for two thousand occupants of the church. This is done by the best means thus far known in the science of ventilation. As stated before, at the northwest corner of the building there is a tower 100 feet high, 16 feet square, and, being open on the inside from its base to the roof, it forms an air-shaft down which the air is drawn by a fan at the base of the tower in the cellar, and is worked by a steam-engine of nominal ten-horse power. Ten feet above the floor of the tower, and inside of it, a perforated water-pipe extends all around the walls for the purpose of making a shower to cool the air in summer and free it from dust if necessary. Arrangements are also provided by which the entire cellar-floor can be sprinkled, so as to settle any dust and cool the air. The fan is constructed of iron, 7 feet in diameter, and has a capacity, when running at a speed of 220 revolutions per minute, of delivering 30,000 cubic feet of air during that time, and the volume of air thus thrown into the church is sufficient to renew the air of the church every fifteen or twenty minutes, without creating any perceptible current, as it is estimated that the air will not move more than from two to three feet per second. The entire cellar of the church forms an air and heating chamber, into which the fan delivers the fresh air. At the ceiling of the cellar there is a net-work of steam-pipes, in all 9,000 feet, and 3 inches in diameter. Before the air enters the auditorium it has to pass over the steam-pipes and becomes warm, and the pressure of the fan forces in a continuous fresh supply. The warm air passes into the auditorium through moveable slats inserted in the risers of the stationary foot-benches of every pew, there being one slat or register to every occupant in the pews, who can open or shut them as they desire. As the ceiling of the cellar is not plastered, and the steam-pipes are fastened along all the beams below the floor of the auditorium, the floor becomes thoroughly warmed and forms a radiating surface of warmth. Particular pains have been taken to avoid draughts of cold air, and should it be desirable to bring cold air into the auditorium, provisions are made to force it in at the ceiling, fifty feet above the heads of the audience, where it can diffuse itself and reach the audience without perceptible current. The fan was constructed by the Nason Manufacturing Company of New York. The steam is generated in two boilers, 16 feet long and 4 feet in diameter, each fifty-horse power. The steam-heating apparatus is called low-pressure and might be termed a hot-water apparatus, as a constant circulation of water is insured, and thus the danger of explosion avoided. The apparatus and all the work appertaining to it was furnished by the firm of Pitken & Co., of Hartford, Conn. The bellows of the organ is worked by a hydraulic apparatus, and this will be supplied from a tank in the principal tower, 125 feet above the sidewalk, a powerful steam-pump forcing the water from a cistern in the cellar into the tank, which will hold six thousand gallons of water. This tank and pump is also to serve the purpose of supplying the fire-hose, which are distributed above and below the roof of the church and all parts of the building, with water in case of fire.

The cellar of the church has been carefully concreted, and a smooth, hard floor made of Portland cement, to exclude dampness, and for this purpose the cellar-walls have been built hollow and cemented on the outside, and in addition an abundance of surface under-drainage is provided, and all the drain and soil-pipes are thoroughly ventilated. All the walls, ceilings, etc., of the cellar have been whitewashed, to give additional sweetness to the atmosphere. In the cellar, also in some of the upper rooms, the usual domestic conveniences of private houses are provided.

In the rear of the main auditorium is a hall, ten feet wide and having two spacious stairways leading to the galleries, which are also reached by stairways, six feet wide, in each of the towers on the Fifth Avenue front. Next to the hall in the rear is the chapel or lecture-room, 45 feet by 75 feet, and 25 feet high, with a gallery on one side, and spacious ladies' parlors, one above the other, on the Fifty-fifth Street end of the lecture-room, and so arranged as to be thrown into connection with the lecture-room and give accommodation to about seven hundred persons. There is also a commodious trustees' and minister's room. Over the lecture-room is the Sunday-school room, of the same dimensions as the former, and having galleries on two sides and one end; also several large class-rooms and a library. Over the class-rooms, on Fifty-fifth Street, is a flat for the assistant-sexton and family.

All the pews, gallery-fronts, organ-case, and all the interior joiner's work is made of the best of ash wood and polished. This work was done by Kimbel & Cabus, cabinet-makers. Some of the beautiful sculptured work was done by Ellin & Kitson; and some by Edward Plassman. The exterior of the building is faced with Belleville, N. J., stone. The mason's and stone-cutter's work was contracted for by James Stewart; the carpenter's work by Jennings & Brown. The painting and interior decoration was done by John H. Mohr. The organ is furnished by Jardine & Son.

A COMPETITIVE DESIGN FOR A $3,000-HOUSE SUBMITTED BY "*Pecksniff.*"

Should any of our non-professional readers desire to build according to this design, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

"'*Pecksniff*' presents an attractive cottage to the eye — one of the best in proportion and in judicious distribution of interesting features, each elevation presenting a point of interest against a background of sufficient plainness to give it heightened effect. The design is picturesque and yet is not without dignity. The details are sober and refined and show a keen artistic appreciation of architectural propriety. Unfortunately "*Pecksniff's*" facile fingers have run away with him. Within a most charming exterior he has jumbled his rooms together with the most wanton carelessness. His point of departure seems to have precluded all consideration of a winter dwelling. After a vestibule is passed one enters directly into the "living-room," from which the stairs open. Such an arrangement might be tolerable in warm weather, but is impracticable for winter use. But even tropical customs do not justify making his only access to the family bath-room directly from the dining-room. The front and back stairs are combined in a way more complicated than ingenious. On the second floor the rooms open conveniently into each other but are carelessly cut up. Though one of the five chambers is indicated as a servant's room, there is ample space in the attic for one or two more rooms, but no means of access is provided to it. "*Pecksniff*" might, by a thoughtful economy in the size and arrangement of his rooms, bring his now too expensive scheme within our limits of expense. His schedule of costs is misleading, especially his item of $25.00 for plumbing, which, even were a convenient place for the bath-room near the kitchen pump provided — instead of its present impossible

position — is quite inadequate for modern requirements. It is to be regretted that one who is capable of such excellent design should appear so utterly incapable of devising or studying a plan, and we recommend to this competitor careful study of the principles and details which govern plans." — *From the Jury's Report.*

HOUSE FOR REV. W. J. HOLLAND, PITTSBURGH, PA. MR. G. S. ORTH, ARCHITECT, PITTSBURGH, PA.

THE $3,000-HOUSE COMPETITION. — VII.

DESIGN SUBMITTED BY "*Pecksniff.*"

ON account of the cost, "*Pecksniff*" has omitted hot and cold water apparatus in plan, locating Bath-room near Kitchen, so that hot water could be passed through slide in partition, and cold water pumped into tub from Kitchen sink; glass between Pantry and Bath-room being, of course, obscure glass.

Stairs are so placed that front and rear stairs and outside and inside cellar stairs are together.

Height of room at landing marked "*Den*," 8′6″, making ceiling-joists 2″ x 8″, 12″ on centres, and raising floor in Servants' Room about 8″ between closet and chimney.

The house is to be heated by portable furnace; nickel-plated registers in first story, japanned registers in second story.

OUTLINE SPECIFICATIONS.

Heights: — Cellar, 7′ 6″; first story, 10′ 0″; second story, 8′ 8″; cellar wall, 18″.

Lath and Plaster: — $\frac{7}{8}$-inch lath, $\frac{3}{8}$″ apart; plaster, two-coat work; last coat white hard-finish, lime, plaster-of-Paris and lake sand.

Timber: — All timber, except as otherwise mentioned, to be hemlock.

Joists: — 2″ x 10″, 16″ on centres; cross-bridged, average 5′ 0″.

Ceiling Joists: — Second story, 2″ x 6″, 12″ on centres.

Sills: — 6″ x 8″; posts, 4″ x 4″; studs, 2″ x 4″, 16″ on centres.

Plates: — 4″ x 4″; studs straight-bridged in each 4′ 0″ of height.

Rafters: — 2″ x 10″, 16″ on centres; hip and valley rafters, 4″ x 10″. Rafters and vertical surface, where shingled, covered with 1-inch rough roof-boards laid 1″ apart.

Shingles: — 18-inch sawed pine shingles, laid one-third to weather.

Gutters: — X-tin over 3-inch rounded strips; three conductors of galvanized-iron, 3″ diameter.

Exterior finish, of dry pine. Siding, 5$\frac{1}{2}$″ wide, laid 4″ to weather, on $\frac{7}{8}$-inch milled and planed pine sheathing. Corner-boards, casings, water-table, etc., $\frac{3}{8}$″.

Porches: — Sill, 6″ x 6″; joists, 2″ x 8″, 16″ on centres, cross-bridged; 1$\frac{3}{8}$-inch floor, matched and planed, lead joints.

Interior: — Floors, $\frac{7}{8}$-inch planed and milled pine, not over 5″ wide. Floor in Kitchen, hard-wood. Partitions, 2″ x 4″, 16″ on centres, doubled around all openings.

Grounds put on for base, wainscoting, etc.

Bath-room wainscoted 4′ 0″ high.

Kitchen wainscoted 3′ 6″ high, with planed, milled and beaded dry pine, put on vertically, with neat base and cap.

Inside Doors: — 1$\frac{3}{8}$″, six panels, flush-moulded.

Front Door: — 2$\frac{1}{4}$″, two thicknesses, flush-moulded, trimmed with imitation bronze. Other doors trimmed with three loose-joint butts; each leaf japanned, furniture, mortise-locks, white porcelain knobs.

Windows: — 1$\frac{3}{8}$″ sash; those that swing in 2″, rebated plank frames, with suitable fastenings; those not swinging, axle pulleys and weights, with cotton sash-cord.

Glass: — Double-thick sheet. Side-lights at entrance, rolled cathedral glass, light tints. Window at stair-landing, stained-glass, at $3 per square foot.

Stairs from living-room to second story to be oak; treads, 1$\frac{3}{8}$″, with nosings and coves; risers, $\frac{7}{8}$″; landing, 3-inch oak strip, glued together.

Painting: — Three-coat work, four tints.

ESTIMATES OF QUANTITIES AND PRICES RULING AT ROCHESTER, N. Y.

Quantity	Item	Rate		Amount	Total
17000 feet	Hemlock,	@ $13.00	per M.	$331.50	
	Machine-work,	2.00			
	Labor,	4.50			
30000	Shingles,	" 4.50	" "	180.00	
	Labor,	1.50			
2000 feet	Siding,	" 26.00	" "	60.00	
	Labor,	4.00			
2000 "	Sheathing,	" 17.00	" "	40.00	
	Labor,	3.00			
8000 "	Finishing-lumber,	@ $59.00	per M.	744.00	
	Machine-work,	3.00			
	Labor,	40.00			
800 "	Oak,	@ $60.00	per M.	78.00	
	Labor,	45.00			
	Doors			85.35	
	Window-sash, glazed			132.02	
	Trimmings			80.00	
	Nails			35.00	
	Painting			300.00	
	Tin-work			30.00	
	Gas-pipe			18.00	
	Carpenter's total				$2,113.87
	Mason			$692.50	
	Heating			105.00	
	Plumbing			25.00	
					$2,936.37
	Architect's commission @ 3 per cent			87.00	
	Total cost				$3,023.37

MASON.

Item	Rate	Amount
150 cubic yards excavating,	@ $0.30 per yard	$ 45.00
91 perch stone,	" 2.50 a perch	227.50
10756 brick,	" 13.00 per M	140.00
880 square yards lath and plaster	@ $0.30 per yard	264.00
Tile for drain		16.00
		$692.50

Note. Builder's profit is figured in with labor. Architect's commission is in this city only three per cent, so I have taken advantage of the locality. Lath is figured with plaster-work.

ROCHESTER, January 1, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

I will build house as designed by "*Pecksniff*" for $2,936.37.

A. W. HOPEMAN,
27 Kelly St., Rochester.

IRON.

MR. GEORGE AITCHISON, A. R. A., recently delivered a lecture on iron as a material for the architect, at the Royal Academy. We append the substance of his remarks: —

Mr. Aitchison commenced by saying that he proposed, in the two lectures which he had to deliver, to enlarge on the most important and the most interesting subjects he knew, viz.: Iron and Color. He treated of iron first because he felt it to be of paramount importance for the architects of the future to consider this comparatively new material. We were, he said, in the midst of the Second Iron Age, and if the first discoverers of iron were able to conquer the then known world by its means, the second great discoverers, the English, had, through its aid, been able to make as great but more peaceful conquests, and to endow mankind with powers only dreamed of by novelists and poets. Iron in one of its three forms, — cast-iron, wrought-iron, or mild-steel, — was now one of the most important building materials we had, but, as yet, it had not been very completely brought into purely architectural use, except occasionally in the subsidiary forms of columns, bressumers, and girders. The great architects of the thirteenth century found brick, stone, and wood used much as they had been by the Romans, and the Romans were sound and even brilliant constructors, for, though they had not the unerring artistic instincts of the Greeks, they had a great capacity for producing splendid and magnificent effects. The Romans, however, had the tribute of the known world for their income, and armies of slaves for their work. No expense was spared on foundations, and daring feats of construction were not, in our sense, cramped by expense; but in all their flights thrust was opposed by mass. The architects of the thirteenth century — the greatest innovators the world had ever seen — had neither the Roman wealth nor Roman means, and had to trust to their own skill and ingenuity and to that of their skilled workmen, to construct buildings rivalling those of the Romans in extent and sublimity, and absolutely original in form, detail, and ornament. To do this they revolutionized construction. Vaults were no longer uniform arches of great thickness, but the groin-points were turned into ribs, and the filling-in was of extreme thinness; and where thrust could not be counteracted by thrust, it was carried to the ground by series of flying buttresses and a wide-spread base of the last buttress. In their carpentry, too, the heavy tie-beam was done away with, and each slender rafter bore its own truss. Could we suppose that, if such a material as iron had been in their hands, as it is in ours, they would not have rivalled our engineers in constructive skill, and, at the same time, given new forms to their buildings and impressed on them new decorations? It has been too much the fashion amongst architects to decry our engineers, — the true children of the age, whose sole aim is utility; and yet, looking at their works from the constructive side of our profession, what can be more admirable? They have carried their constructive skill to a pitch that even the thirteenth-century architects might envy; and no man can walk down the vast nave of the Crystal Palace and see its filmy construction and its flood of light without thankfulness and admiration; and if any regret mingles with its emotion, it is that the building's tenure of existence

is almost as frail as the spider's web it rivals. Architecture, it is true, has, in the present day, fallen upon evil times, but no architect should shut his eyes to the signs that by slow degrees this insensibility is passing away, and a faint and tepid interest is being awakened. But the position of architecture is not wholly due to outside influence; it is partly due to the retirement of its professors from the actual strife of the world. As he had pointed out in a former lecture, architects were inclined to pose as gentlemen and not as brick-layers. Roofs and domes were beneath their notice; they merely attended to the æsthetic part, and architecture had come to be looked on as a sort of potted art, — a delicacy for the *gourmet*, and not honest bread and meat for the multitude. Architects must free themselves from all this nonsense, and strive to be great constructors, doing what they can to impart character to our buildings. Passing on to consider minutely the materials with which he had to deal in the present lecture, Mr. Aitchison observed that cast-iron, wrought-iron, and steel are perfect materials, for, with the exception of the glazing, the whole of the structure may be made of each one of them, though practically their employment for certain parts of a building might be inconvenient. Iron can be cast into almost any form, and enriched with almost any ornament. Cast-iron is very strong as compared with other materials, and consequently takes up a small space, and particularly lends itself to the bony structure of a building, especially if the building be symmetrical. Its defects are that it rapidly transmits heat, and in damp weather horizontal pieces drip and vertical pieces stream with water. It melts in great heat, and if heated to redness and cooled by water it cracks. Its contraction and expansion under variations of temperature are considerable, and it rusts rapidly. Professor Barff's process is said to prevent rusting, but it is not practically in use. Iron may also be enamelled, but the cost is great, and the experience of its efficacy insufficient. Cast-iron is difficult to cast in very long pieces, and ornament cannot be chased after casting. Its peculiarities are that it is very heavy; that it is, roughly, six times as strong in compression as in tension; and that unless its parts are of nearly uniform thickness, it tears on cooling: so that in the case of girders the lower flange must be six times as wide as the upper one. Patterns have to be made for each piece: hence there is a strong desire for repetition to minimize the cost of patterns. Wrought-iron and mild-steel might be considered together, as they were practically the same material, only one is stronger than the other. Their capabilities are less than those of cast-iron in most particulars, but their tensile strength is much greater, being, in wrought-iron, about three and one-half times as great, and in steel five or six times as great. Both wrought-iron and steel can be rolled into very thin plates, and these plates can be riveted together, so as to be of any length. The defects of wrought-iron and steel are the same as those of cast-iron, except that they rust more readily; and though they will not melt under the influence of great heat, they crumple up like wet paper; and they are susceptible of no kind of ornament or shaping, except at enormous cost. Their peculiarities are that they are mostly built up,—*i. e.*, riveted together into the required form from plates, tubes, bars, L, T, H, and U pieces. As cast-iron is six times stronger in compression than in tension, and as much variation of thickness causes fracture in cooling, and we can rarely core the lower flange, there is a wonderful scope for ingenuity in trying to make a girder sightly. Again, in columns, every considerable swelling out, — as in caps, bases, or the lower parts of shafts, — is a source of weakness and danger instead of being an additional strength, as in wood or stone. All incised work is a fatal element of weakness, and if much relief is wanted in caps cast onto columns their ornaments have to be stuck on. Mr. Aitchison said he made no apology for treating of the natural qualities of the materials, for without knowing these it is impossible to design in them either with safety or propriety. Architects are, before everything, constructors, and paper architects are a mere burlesque,—even worse than sculptors without anatomy. To go farther, it is the want of a thorough knowledge of the properties of iron, and of the abstruse statical problems connected with its use that has condemned it to be so little used architecturally by architects. Two minds cannot act like one, and the scientific mind with no art, and the artful mind with no science, are apt to be like two horses pulling in opposite directions. The use of iron has restored the post and beam construction of the Greeks, and swept away the arches, domes, and vaults of Roman and Mediæval times. It is not that arches or domes cannot be made, but as there is no abutment the ribs must either be girders without thrust, or be trussed or tied. From the energy of the material the proportion of voids to solids is so great that it is unusual and unpleasant to the eye, and from the small size of the supports where they do occur they tend to effacement. In fact, this may be said generally of iron, — that it tends to effacement. In proportioning the parts of columns our module must be something different from half the diameter when the columns are, not from eight to ten diameters in height but from twenty-five to thirty diameters, or more. If we are to have old-world ornament we must go to the bronze tripods and candelabra of Greek and Greco-Roman times, or to those fantastic structures found in the arabesques of Rome and Pompeii which so stirred the bile of Vitruvius. Iron, however, is absolutely untrammelled by any former scheme of design or of ornament. We want to analyze the causes that produce satisfaction or admiration in our minds when we look at a building, and having discovered them, to endeavor to apply the principles to the iron-work we have in hand. This knowledge will prevent us from going wrong, but we must be blessed with invention if we are to go right. It is, perhaps, not so difficult to make a structure sightly when we have cast-iron columns of any considerable size, and cast-iron girders of inconsiderable span; but when the girders are of wrought-iron and of large span the difficulty is considerable; for the girders then mostly take the form of a series of strung triangles, with lines at the top and bottom, or of lattice-work. Iron will not do for external walls, and if we use brick, stone or concrete, the outside of the building ceases to show that it is iron construction. A feature might be made of iron in this way: between the main iron supports there might be thin iron ones, double-slotted, and filled with earthenware slabs ornamented in color; the black lines of the iron-work would then look well, — something like half-timbering on a small scale. A splendid hall ceiling might be made of cast-iron girders carrying smaller ones, so as to make small square panels filled in with red glazed earthenware domes, enriched with gold. Corrugated-iron is absolutely unusable, in point of effect, except on a colossal scale; when it can be so used, the corrugations, that destroy all scale where the size is small, merely give a texture, but we must then arrange for something to take off from its papery appearance where there are openings or overhanging roofs. Of iron buildings there are many, mostly of the corrugated-iron type, as churches, schools, sheds, etc., most, if not all, simply hideous. Iron, like other materials, is apt to bear upon its face the impress of other forms of construction. The arch is frequently exhibited in it, though perhaps this is not more ridiculous than wooden arches or wooden vaulting. Gasometers are sometimes picturesque structures, and different examples show how iron may be used so as to be ridiculous and ugly, or appropriate and elegant. As an example of the former, you see a series of attenuated Roman Doric columns set in a circle, each column with its capital connected at the top by thin pierced cast-iron girders, occupying an inch or two of the middle of the projecting caps; but, occasionally, gasometers whose shafts are connected with iron ties are quite picturesque; and, latterly, the lecturer had seen a very elegant one, of which the standards were battered on the outside, and made of heavy wrought-iron lattice-work, held together at the top and midway by very slight lattice girders. In England, we have three classes of people, — those of cultivated taste, who admire beauty and will not willingly do without it; those who pretend to admire beauty and do not; and those who neither like nor pretend to like it, and who shamelessly proclaim that beauty is all nonsense. Roughly speaking, the last class represents the age, more particularly so in regard to iron, because those whose architectural taste has been cultivated have cultivated it by the study of brick, stone, or marble buildings, and only look on iron as a make-shift, which they would not use if they could help it. Not that there is no elegant iron-work in England, for there were excellent bits here and there, as, for example, the iron-work to the glass domes of an office at the Bank of England, designed by Professor Cockerell, which, like all his work, is refined and elegant. In France and Belgium there is greater demand for artistic work than in England. The lecturer proceeded to speak of the essays made in those countries to develop the treatment of iron. Victor Hugo prophesied, after the event, that printing would kill Gothic architecture; pointing from a printed book to Notre Dame, he said: "This will kill that." Now hear the prophecy of another distinguished Frenchman, who echoes the words, "This will kill that," pointing from the cast-iron of the Halles Centrales to the stone-work of St. Eustache. "Iron will kill stone, and the time is near." Since the beginning of this century, only a single monument has been built — a monument copied from nothing, and which has sprung naturally from the soil of the epoch, and this is the Halles Centrales of Paris,—a swaggering work if you like, but which is only a timid revelation of the twentieth century. Although the Halles Centrales seem admirably adapted to their purpose, and have, in fact, served as a model for markets in different parts of the world, the problem of the use of iron for architectural effect has not been satisfactorily solved by them. Some of the details are good, but the buildings themselves exhibit a flatness and uniformity very far from the lecturer's notion of architectural beauty, and the best part, the gutter on corbels, is spoiled by the corbels being of stone proportions. The arch that joins the two blocks is thin, and not very nicely proportioned. The interior effect of the galleries is spoiled by a regular succession of skylights in the roof, which mar any grand effect of light and shade. Inside each block, the central part is impressive from its size and height. Its circular arches, and open spandrels filled with strap foliage, and its open cross and panel-work do credit to M. Victor Baltard's skill. There are, however, two splendidly successful works of iron construction in Paris, — the Northern Railway Station, by Hittorff, and the National Library, by M. Henri Labrouste. After describing the Northern Railway Station in terms of commendation, on account of its grand proportions, and the excellence of design shown in its iron-work, particularly in the columns—observing incidentally, that the columns bear the inscription, "Alston & Gourlay, Glasgow, 1862, British Iron-works," so that M. Hittorff found the brains although we found the labor and materials, — Mr. Aitchison proceeded to speak of the National Library as being as agreeable a room as one could wish to see. In the middle of the room are four most elegantly-slender cast-iron columns, bearing cross-braced wrought-iron arches, and from these spring nine domes with eyes at the top. The Fine Arts Schools, by Duban, has its entrance hall formed of cast-iron girders filled in between with cream-colored terra-cotta arched and slightly

enriched with a raised pattern. After M. Duban's death, M. Coquart had to cover the court to form a sculpture gallery, but was unwilling to touch Duban's work, so kept his few columns in pairs detached from the building, carrying the intervening spaces by iron cantilevers in the cornice. After incidentally mentioning the great extent to which bronze is used in Paris as a material for lamp-posts, railings, etc., the lecturer proceeded to speak of the Exchange at Antwerp, which has its central court covered in one span by wrought-iron trusses, and glazed at the sides, the collar-beam carrying a plaster ceiling. The wrought-iron bearers are treated after the manner of the wooden ones at Wollaton Hall. The constructional iron-work is so slight that it is almost lost, and to fill the vacant space and catch the eye, wrought-iron fruit and flower work has been introduced. A vast building for the sale of drapery, close by the station of St. Lazare, and called, "Les Magasins du Printemps," is now being built by M. P. Sedille. The whole interior construction is of iron, and each external bay is wholly of glass, the framework being of cast-iron, wrought-iron, and bronze, enriched by gilding, marble, and mosaic. It is worth study by architects visiting Paris. In conclusion, the lecturer expressed the hope that what he had said might stimulate his hearers to devote themselves to the architectural development of iron, the grand material of the future, with an ardor, a single-mindedness, and a self-denial that would not be in vain. — *The Builder*.

AN ARCHITECT'S RESPONSIBILITY.

THE extent to which an architect may be made liable for the negligent performance of his duty has been established with a tolerable degree of precision in the cases which have from time to time come before the courts; but the question yet remains, and it is one of considerable interest, how far and under what circumstances an architect may by his conduct lay himself open to a charge of breach of duty, both towards the employer and towards the contractor, by acting in such a manner as to afford reasonable ground for doubting the disinterestedness of his motives — in other words, what conduct on the part of the architect will lay him open to a charge of constructive fraud in his dealings between the parties?

It has been attempted over and over again, but hitherto without success, to charge the architect with liability for the negligent performance of his duty, that duty being one to the discharge of which the exercise of judgment and opinion is necessary. There is, it is true, an example recorded which would seem to give some encouragement to the view that an architect or surveyor is so liable. In that case the defendant was a surveyor, who held himself out as specially qualified as a valuer of ecclesiastical property, and it was admitted that the defendant had in this particular instance failed to observe the distinction between the case of a valuation as between incoming and outgoing tenant, and a valuation as between incoming and outgoing incumbent. Chief Justice Jervis thought that the surveyor could not be expected to supply minute and accurate knowledge of the law, but that, under the circumstances, he might properly be required to know the general rules applicable to the valuation of ecclesiastical property and the broad distinction between the cases of an incoming and outgoing tenant and an incoming and outgoing incumbent, and that inasmuch as it appeared from the evidence that the surveyor acted in the valuation as if it were the case of an outgoing and an incoming tenant merely, and that he knew no other rule.

It was held accordingly in this case that, although the surveyor was not bound to possess a precise and accurate knowledge of the law respecting the valuation of dilapidations as between outgoing and incoming incumbent, yet that he was bound to bring to the performance of the duty he had undertaken a knowledge of the general rules applicable to the subject, and of the broad distinction that exists between the case of a valuation as between the case of an incoming and outgoing tenant, and a valuation as between an incoming and outgoing incumbent. It will be seen that in this case the surveyor held himself out as being specially qualified for particular work and failed to perform it, and that his negligence did not involve the exercise of his opinion or judgment, but an absolute and culpable neglect to perform a specific work which he had undertaken to do.

In a case in which the plaintiff sought to charge the architect with responsibility for an inaccurate bill of quantities, on the faith of which he had entered into a contract, Lord Coleridge observed that the action would have been maintainable if it could have been fairly contended that the relation of the parties was this, and this only — that the plaintiff had undertaken to do certain work under a contract with a third person; that the contract was one to which the defendant was in terms no party; but that he was aware of it and had acted under the duty which it imposed on him of doing certain work requiring no judgment or opinion, but what he might call the exercise of ordinary arithmetical powers, and that his performance of that duty under the contract was necessary to enable the plaintiff to recover his money, and that he had neglected that duty. If that was the true construction of such a contract he was of opinion that an action would lie, for none of the cases cited in the argument were cases in which the imposed duty was such as he had described, and the breach of duty of the nature that he had indicated. The present claim, however, was not such an action, but was really an attempt to bring an action for negligent performance of duty, to the discharge of which the exercise of judgment and opinion was necessary. It was held that in the absence of fraud the action was not maintainable.

It was of course conceded in the case to which we have last referred that the exercise of judgment and opinion on the part of the architect were necessary to enable him to take out the quantities, and the principle upon which this decision was founded may be further illustrated if we suppose the case of a builder seeking to charge his employer with liability for the inaccurate quantities supplied by the architect. The defendant employed an architect to prepare plans and a specification for a house, and to procure a builder to erect it for him. The architect took out the quantities, and represented to the plaintiff, a builder, that they were correct, and the plaintiff thereupon made a tender which was accepted. The quantities proved to be incorrect, and the plaintiff expended upon the building a much larger amount of materials than he contemplated. It was held that there was no evidence that the architect acted as the defendant's agent in taking out the quantities, or that the defendant guaranteed their accuracy, and that therefore the plaintiff could not recover more than his contract price. These examples are sufficient to illustrate the principle that an architect is bound to bring to the discharge of his duty ordinary skill and ability, but that he cannot be rendered liable for the consequences if his judgment, honestly exercised, should it turn out to be erroneous, or if his opinion, given in good faith, should be found to be wrong or inaccurate. Where, therefore, the exercises of judgment or opinion on the part of a third person are necessary between two persons, and in the opinion of one of the two such opinion or judgment has been wrongfully or negligently exercised, no action can be maintained against a person standing in the position of a third party, that is to say, the architect.

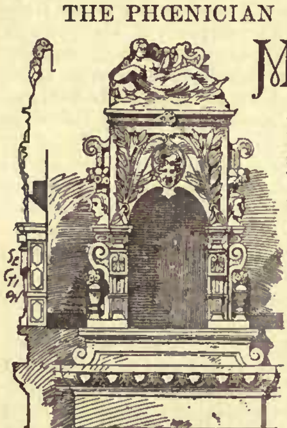
But there is another light in which the relation of the architect both to the builder and employer should be viewed before we can accord to him absolute immunity from the consequences of his apparently erroneous opinion or negligent or unskilful discharge of duty. The architect is bound to act with strict probity and impartiality in his dealings between the parties. He must enter into no secret or tacit understanding either with the builder or with the employer, neither must he act in any other manner inconsistent with his duty to both. His position is founded on the assumption of his integrity and impartiality, and if he by his acts afford reasonable ground for presuming that his opinion or judgment has been biassed or influenced in a manner inconsistent with such an assumption, he becomes at once liable for whatever injurious consequences may follow to either party. Where, for example, the architect was appointed arbitrator in respect of extra works under a builder's contract, and it was proved that the architect had guaranteed to his employer that the total cost should not exceed a specific sum, but that that fact had not been disclosed to the builder at the time when he signed the contract, it was held that the guaranty was a material fact tending to influence the architect's decision, and as it was not disclosed to the builder, he was not bound by the submission to the architect's arbitration.

A case has, in fact, been recently tried at the Crewe County Court in which this very important question was raised and discussed, and the facts of which illustrate very forcibly the delicate and responsible nature of an architect's duties. The employer claimed damages against the architect and builder jointly for a breach of contract in erecting two dwelling-houses. The plaintiff, it seems, employed a Mr. Atkinson, an architect, to prepare for him plans and specifications for the erection of these two houses. Tenders were invited, and eventually the tender of a Mr. Potts, the other defendant, was accepted to build the houses for £460. The plaintiff alleged that Potts had used inferior materials in the construction of the houses, and that Atkinson had passed over the defects without correcting them, or complaining of them or of the inferior materials used. There does not seem to have been any suggestion of fraud or collusion made by the plaintiff in the first instance, and the objection was rightly taken that no cause of action existed under such circumstances, there having been the usual condition imported into the contract to which the plaintiff and the defendant builder were parties, that the work should be done to the satisfaction of the defendant architect. But it would seem that the evidence, so far, disclosed sufficient facts to induce the judge to hear the case and reserve to himself the power of determining whether there had been such fraud in the transaction as would allow the action to be maintained. From the evidence, and the eventual decision of the judge, there could be no doubt that the materials used in the erection of the houses were of a very inferior quality, that the work was not done in accordance with the specification — in fact, that the work had been "scamped" throughout. The architect, however, had passed the work, and the

builder was entitled to his money. So far, therefore, however bad the work or inferior the materials, the architect, being chosen arbitrator between the parties and having passed it, the plaintiff had no redress. But other facts were disclosed in the course of the evidence which led the learned judge to the conclusion that the architect had acted in a manner inconsistent with his duties towards the parties under the contract, and that under such circumstances the contract could not be considered conclusive against the plaintiff. It seems that Mr. Atkinson, the architect, had been in the habit of preparing plans for Potts, and that this fact was not communicated to the plaintiff at the time when the contract was entered into. The judge rightly termed this an unfortunate thing, but unless this fact were coupled with other circumstances it could not be considered of sufficient importance to ground an allegation of fraud against the architect. But it appears that the architect had handed over to the builder the plans and specifications for the work, and had not even kept copies which he was bound to do for the protection of his employer, and had altogether acted in a manner inconsistent with his duties towards his employer. In giving judgment in the case the learned judge observed that both the defendants had perfect cognizance of facts which, if they had been disclosed to the plaintiff, made it quite certain that he would not have allowed the defendant, Mr. Atkinson, to be an arbitrator between him and Potts in respect of those two houses. Potts had gone about the work in a very loose manner, not having, as he himself admitted, read the specifications before he took the contract. An architect in ordinary cases would have had a copy made of the plans and specifications, and kept them for the protection of both parties; but here it was shown that Mr. Atkinson had handed over the plans and specifications to his co-defendant, who lost them, and an action had to be instituted for their recovery. Alluding to the evidence as to the repairs needed, the learned judge remarked that several matters included in the specification had been altogether omitted, and that very great defects existed in the work as it stood. He proceeded to give the judgment for the plaintiff in respect both of the defects in the work and inferior quality of the materials used.

An architect cannot be too scrupulous in his professional conduct, and if he stand towards the builder in such a position as to render it impossible for him, in the judgment of reasonable men, to act in an honorable and impartial manner towards the employer, by reason of conflicting interests or engagements hostile to his employer's interests, he is bound to disclose all such facts to his employer before he accepts a position incompatible with any such relation or engagements. Should he fail or neglect to give his employer information of such material facts, he will be held liable in consequences, which may be disastrous both to his pocket and to his reputation. — *The Architect.*

THE PHŒNICIAN ANTIQUITIES OF MALTA.



MALTA stands to most Englishmen for a great naval station in the Mediterranean, a half-way house to Egypt, a place where there is a fine climate, much going to and fro of men and ships, and a native population forming the background of a floating society of military Englishmen. Historically, one is apt to think of it as belonging to the Knights of St. John of Jerusalem, who made it their stronghold, after they were driven by the Turks out of Rhodes, — while a Biblical student here and there may identify it with the Melita where the savage people showed themselves hospitable to the ship-wrecked Apostle to the Gentiles. Few, we venture to say, have ever looked upon it as a place where are to be found Phœnician antiquities of a kind existing nowhere else. Yet this is what Professor Sayce, of Oxford, one of the most accomplished Orientalists of our time, declares to be the case. He speaks in the strongest terms of the "archæological treasures" of the island. "The Maltese Islands" he says, "are the only part of the world in which remains of Phœnician temples still exist. Elsewhere, in Cyprus, in Africa, in Phœnicia itself, they have disappeared, and we have to derive our knowledge of buildings which must have structurally resembled the temple erected for Solomon by Phœnician architects from the notices of ancient writers. In Malta, however, the ruins of Hagiar Kim and Innaindra allow us to trace their ground plan and details, while the so-called Giants' Tower in Gozo is a still better-preserved specimen of a Phœnician sanctuary." Unfortunately these most interesting ruins are fast falling into decay. The "Giants' Tower in Gozo" is, happily, the property of an enlightened nobleman, who has placed it in careful guardianship. But elswhere neglect reigns, and ruin increases from day to day. Where in certain cases, excavations have been made with striking results, the peasant proprietors not having been compensated for the loss of their land, have idemnified themselves by treating the monuments after the manner of their kind. "The temples of Hagiar Kim and Innaindra," says Mr. Sayce, "which were excavated in 1839, are being rapidly destroyed. The peasants on whose land they are naturally regard them merely as useful quarries for stone or attractive resorts for picnic parties. I found, upon visiting them, not only that many of the monoliths composing the walls of the chambers have been recently removed, but that even the altar-stones, so precious in the eye of the archæologist, have been wantonly thrown down and broken." In one place, Coradino, which appears to have been one of the chief seats of Phœnician civilization in Malta, Mr. Sayce traced the remains of no less than five Phœnician temples. But although this is government property the ruins are fast disappearing. Engineers, some time ago, took the stones to build fortifications with, and what the engineers left the neighboring peasants are eagerly appropriating. Yet the lack of protection, it would seem, can only proceed from want of information on the subject in high places. When a Roman villa was discovered at Civita Vecchia, the Maltese Government walled it in and gave it a custodian at the public expense. Yet Roman villas are common enough all over Europe, "while it is only in the Maltese islands that the archæologist can still find the remains of Phœnician sanctuaries." We commend the subject to Mr. David MacIver as one that he can make his own with real advantage to the public. He knows Malta well, and has some right to speak for it. And he would be much better engaged in protecting the last architectural vestiges of an extinct religion than in trying to galvanize into fresh life economical theories that are just as dead. — *Liverpool Post.*

NOTES AND CLIPPINGS.

Bending Copper Tubes.— For bending copper tubes the almost universal practice is to fill the tubes with lead or rosin, then bend them round the chuck, or something of the same radius as that required for the bend. The lead or rosin may then be melted out. A machinist at Philadelphia some years ago, devised an ingenious apparatus for this purpose, which, however, has not come into general use. It consists of a flexible mandrel of steel, made of wire of square cross-section, and with the coils lying in contact so as to form a close spiral. By inserting one of these of the right diameter into the tube, it can be bent to any angle without wrinkling. When properly bent, the mandrel can be readily withdrawn by simply taking hold of one end of it and drawing on it, giving it, at the same time, a slight twist to lessen its diameter. At the time this invention was first brought out, it was said to answer the purpose very well.— *The Metal Worker.*

The Ponte Vecchio, Florence.— Word reaches England from Florence that the Ponte Vecchio — the ancient bridge over the Arno — is shortly to be pulled down because unsafe. It is said to be in danger of being carried away by the Arno in flood time. "We need hardly point out," says William Morris, of the Society for the Protection of Ancient Buildings, "the unrivalled historical interest and artistic beauty of this world-famed bridge, with its three graceful arches crowned by a picturesque group of houses, over which is carried the long passage connecting the Pitti and Uffizi palaces. Not only the arches of the bridge, but portions of some of the houses, are still preserved exactly as designed by Taddeo Gaddi, and built in A. D. 1362 — an object of the greatest beauty both when seen close at hand and as one of the chief features in the glorious distant view from San Miniato." He has no doubt that some careful engineering work is required to save the bridge, the foundations of which have been seriously undermined by the scour of the stream; "but it certainly," he adds, "would not be beyond the skill of modern engineers to underpin and secure the falling piers." — *Pall Mall Gazette.*

Discovery of an Altar-Piece by the Brothers Van Eyck.— There has been much said in the Belgian papers, and also in some of the English journals, about the discovery of an important altar-piece by the brothers Van Eyck. The facts of the case seem to be these: For centuries this altar-piece had lain unheeded in the hospital at Enghien, attracting no observation, until a short time ago it was given to the sculptor, M. Reuse-Leroy, in part payment for some work he had done for the hospital. He sold it to the Abbé Bosmans, archivist to the house of Arembery, who appears to be a clever connoisseur. Then, and not till then, was the picture discovered to be by Van Eyck. The Abbé Bosmans has deciphered on the right wing the signature, V. E. Y., and on the left wing a leafless oak tree, which he imagines to be a sportive allusion to the birthplace of the Van Eycks — *Maaseyck*, or old oak. All this, according to the London *Athenæum*, is pure hypothesis, which further says that Jan Van Eyck never signed in this way any of his known pictures; on the contrary, his signature is plain and full, and there seems no explanation of the Y. that ends the present signature. Nevertheless, the Abbé Bosmans is confident, and has published a pamphlet on the subject, by which he, no doubt, hopes to sell his picture to some of the great galleries. But it will need the judgment of many experts before it can be accepted. It was laid down as a rule by Wornum that, "unless an early Flemish work be perfect in all its parts, it cannot be by Van Eyck;" and this is not a bad rule for guidance. Does the newly discovered Van Eyck accord with it? The picture in question is a large triptych, depicting in the centre compartment the entombment of Christ; and, on the wings, a scene from the revelation, with St. John seated in a rich landscape in the foreground, and the divine mission of St. James to Spain, which would look as if it were originally painted for some Spanish patron. However this may be, it is too soon to conclude that the world is enriched by another of those magnificent altar-pieces that we know by the name of Van Eyck. — *Boston Herald.*

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A REPORT has been prepared for the National Board of Health, by Mr. E. W. Bowditch, upon the sanitary condition of the health resorts upon the Atlantic Coast. A similar report, made to the Massachusetts Board of Health some years ago, upon certain watering-places in that State, excited great attention, and led directly to a most wholesome reform in sanitary matters in the places spoken of, and it is to be hoped that the same result will follow the appearance of the present document in the territory of which it principally treats. Mr. Bowditch's observations were mostly made, for the purpose of the present paper, in the belt of sandy sea-coast between Cape May, at the southern extremity of New Jersey, and the mouth of the Hudson River, and as this belt is occupied by a continuous line of towns and villages, which accommodate in summer an immense number of persons, he found an ample field for inquiry and criticism. Atlantic City, the most frequented of these resorts, which has a regular summer population of fifty thousand, often swelled for a day to seventy-five thousand by excursions from the great cities near by, Mr. Bowditch found to be built upon a spit of sand, ten miles long and three-quarters of a mile wide, separated from the main land by a navigable creek, with seven miles of salt marsh beyond, and fronting the sea on the other side. No portion of the territory is more than twelve feet above tide-water, and there are of course no brooks or springs on the island. Water for drinking was formerly obtained from shallow driven wells, but these have been abandoned, and cisterns have been generally substituted for them. Within the last season, however, a supply has been brought across the marshes from the main land, so that the town is now much better off than most summer resorts in this respect. In regard to drainage, the complement of water-supply, much remains to be done. No sewers exist, and none are practicable under present circumstances, as their outfall would necessarily be in the creek at the back of the island, where it would be very difficult to get rid of the foul matters delivered. As a substitute for sewers, cesspools are universally used, but the ground-water lies so near the surface that their contents drain away slowly, and are not carried far, so that they soon become offensive. During the past season garbage, which gives more trouble in watering-places, if possible, than the cesspools themselves, has been regularly removed every day, by a public service, from all private houses, and twice each day from the hotels, so that in this respect the police of the place is exceptionally good. It is impossible not to wish that means might be found for extending the operation of the same service to ordinary drainage matters. This does not seem impracticable; and something of the kind has become a necessity if the so-called "health resorts" are to continue to deserve their name.

THE most distinguished of French sanitarians, M. Durand-Claye, sends to *Le Génie Civil* a communication which comprises the substance of an address delivered by him at the Hygienic Congress in Geneva last year, but will, for all that, be new, as well as interesting to most readers. The paper treats of the subject of municipal hygiene in general, and particularly of the sanitary needs of the city of Paris. No one needs to be told that the drainage of Paris, as we understand the word, hardly exists as yet. The "*fosse*," or tight cesspool, emptied at fixed periods by the public scavengers, still keeps its place under every house, and the great sewers convey little else than the washings of the streets. With the introduction of an abundant water-supply, however, has come the necessity for a different system. As M. Durand-Claye says, water, the prime instrument of domestic hygiene, must, so long as the cesspool system is retained, be proscribed by house-owners, who are obliged to pay the scavengers by measure for the removal of waste liquids, and will naturally employ all possible means for restricting their quantity, and if the benefits of cleanliness are to be enjoyed by the people, the water with which they wash themselves and their houses they must be got rid of in some better way than that now in use. After discussing the Liernur pneumatic system, which he condemns for the very reason that it also restricts the amount of water used for household purposes, the writer proceeds to consider the various modes of conveying and disposing of the large flow of sewage which he thinks to be the necessary consequence of the best conditions of life in cities. Like most other modern experts, he rejects totally that form of sewage disposal which consists in pouring the nitrogenous contents of the drains into the sea, regarding this as a futile expedient, adapted only for a temporary use. The various processes of decantation or mechanical filtration, as well as those of chemical precipitation, he also considers to be practically valueless. Recent analyses have shown that the clarified liquid remaining from these operations always retains at least one-half of the azotized matters contained in the sewage before treatment, and is therefore very nearly as unfit as ever for return to the water-courses into which it is generally allowed to flow.

THERE remains, then, as he says, but one practical and rational mode of purifying sewage. This is the treatment by irrigation, in which the cleansing and oxidizing action of the soil is assisted by vegetation. Already, this system is employed for more than one hundred and thirty towns in England, as well as the great cities of Berlin, Dantzic and Breslau, and to a considerable extent for Paris itself; and continued experience increases the advantages which it is found to offer. Some very interesting experiments with the microscope have been made upon the sewage of Paris, to ascertain the changes which it undergoes after delivery upon the fields of Gennevilliers, and it has been found that by actual count the sewage as delivered contains about twenty thousand microscopic germs to the gramme, or cubic centimetre. After soaking through the soil, as collected from the outlet-drains which conduct the surplus liquid from the fields, the average number of germs is found to be twelve to the gramme. The water of the Seine at Clichy contains thirty-two hundred germs to the gramme, and at Bercy fourteen hundred, while the water of the Vanne, which has lately been introduced into Paris for drinking and cooking, and is delivered to the houses in special pipes, contains sixty-two; or, in other words, is five times more impure than the street-washings of Paris, after a single rough filtration through a saturated soil. It is remarkable that the oxidation of the nitrogeneous part of sewage, which is known to take place in the pores of the soil, is now found to be due to the action of organized animalculæ, millions of which exist in the surface loam. This is demonstrated by a curious experiment, which has been several times repeated. A tube of glass, six feet long, is filled with natural sand, and sewage of the foulest character is poured in at one end. After some time the liquid appears at the lower end, perfectly oxidized, with all its ammoniacal compounds converted into inert nitrates, the analysis of which gives an amount of nitrogen just equivalent to that contained in the organic part of the original sewage. If now a little chloroform is allowed to pass into the tube, the industrious little organisms contained in the sand are put to sleep, and the sewage passes through unchanged; and only a thorough washing with pure water can re-establish the oxidizing action of the earth.

SO well does the system of irrigation work at Gennevilliers, notwithstanding the complaints made a few years ago in regard to the offensive flooding of the ground, that the demand among farmers for a share of the fertilizing liquid grows greater every year. In ten years the number of acres submitted to irri-

gation has multiplied by ten, while the quantity of sewage used upon them has increased in even greater proportion. The rental of land in the irrigated district has risen from forty francs an acre to two hundred, and farmers from all directions, attracted by the wonderful productiveness of the soil so treated, have settled in the place in such numbers as to increase the population, according to the census, thirty-four per cent in five years. At the time of the complaints which were so loudly made, apparently from some interested motive, the city authorities of Paris took measures, out of pity for the injured people of Gennevilliers, to find other irrigation grounds farther away, but the people of the town, alarmed at the prospect of losing their monopoly of the fertilizing streams, suddenly withdrew their objections, and joined cordially last year with the Parisians in a treaty by which the delivery of the sewage to them is to be continued for twelve years. So satisfactory is this arrangement to the villagers that they have already celebrated the treaty by erecting a monumental fountain in the most conspicuous part of the town, bearing two clasped hands, with the motto, Paris —Gennevilliers, 1881. After this experience, which is only that of all the other towns which have tried sewage disposal by surface irrigation, it is certainly remarkable that not a single community in the United States should have had the courage to adopt the same system. That want of money is not the reason for this backwardness in adopting the results of so many successful experiments is shown by the readiness with which the people of Boston, for instance, have undertaken to spend an enormous sum in conveying the sewage of the city into their harbor; and by the popularity of the preposterous scheme for building in the suburbs of the same city a main trunk sewer nearly as long as that of London, to convey to tide-water the sewage of a dozen villages which have no sewers at all, and are not likely to have any until such a mode of disposition has long been obsolete.

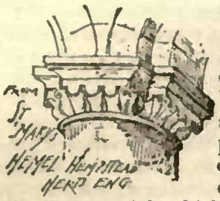
OFFICIAL notice has been sent to the Department of State that the Italian Government desires to invite artists of all nations to compete in furnishing designs for a national monument, to be erected at Rome in honor of King Victor Emmanuel. The monument is to consist of a bronze equestrian statue of the King, standing upon a base which is to be at least thirty metres wide and twenty-nine metres high in its central portion. Elsewhere its height is to be at least twenty-four metres. The design of the base is left entirely to the taste of the artist, and the steps leading to the esplanade on which the monument is to be placed will be regarded as a part of the structure. Drawings will be received from November 15 to December 15, 1883, and will be judged by a royal commission. The author of the design placed first will be awarded a premium of fifty thousand francs; and fifty thousand more will be divided by the jury among the most meritorious of the other competitors. In arranging this new competition the Italian Government has shown its liberality, as well as its sincere desire to obtain the best possible design for its memorial to the patriot king, in a way which should insure the success of its endeavor. It is said, and probably with reason, that none of the projects submitted in the first trial which had any great artistic merit could have been carried into execution even for the large sum which it was proposed to expend; and this, if true, would be a sufficient reason for throwing them all aside; but it was also said, perhaps with truth, that none of them were in other ways suited to the circumstances.

AT the last meeting of the New York Board of Fire Underwriters, held in November, a committee was appointed to visit the so-called "dry-goods district," and report upon it, suggesting better means for protecting the property in the district from fire. The report is now completed, and contains at least some interesting statistics. The height of structures is an important matter to firemen, and the committee noted the dimensions of those which it inspected, finding that more than half the buildings in the district are over seventy feet high; and of these one hundred and thirty-six are over eighty feet, twenty-four over ninety feet, and seven over one hundred feet high, while one reaches the height of one hundred and twenty-nine feet. There can be no question that these lofty piles, extending far above the natural level of the water in the Croton pipes, and nearly as far above the effective reach of the stream from an engine, menace the safety of the whole neighborhood about them, and the committee very properly proposes that the rates of premium should be advanced upon all buildings more than sixty-five feet in height, unless they are made of fire-proof materials throughout. Another recommendation of the committee seems to us hardly so reasonable, although it is perhaps justified from the underwriters' point of view. It has been the rule in New York for some years to make a small reduction in premium rates upon goods stored in buildings furnished with stand-pipes, on the theory that by means of these pipes, which have branches for couplings at every floor, with a connection for an engine hose at the foot, water could be applied with much greater precision and effect to burning material in any room than if it had to be thrown at random from an engine in the street. The chief engineer, however, having mentioned that most of the stand-pipes in the district are useless from neglect, the committee forthwith asserts that "No farther allowances should be made for the stand-pipes commonly in use." If this is intended to mean that the underwriters will henceforth test the stand-pipes on account of which a rebate of premium is asked, and will grant such rebate only where the pipe is in good condition, the effect of the new rule would be very salutary; but if, as is too often the way with insurance managers, a statement which we cannot help regarding as rather ill-founded should be seized upon as a pretext for refusing under any circumstances the small concession now made, the consequences to the underwriters may be serious.

THE Government of the Province of Ontario, comprehending that, although one hundred and twenty million acres of primeval forest still exist within its territory, the replacing of its timber supply for future needs will depend upon the wise provisions made now, has had under consideration a bill providing for the payment of a bounty out of the public treasury for the planting of trees along farm boundary lines, and by the sides of roads. The bounty proposed is not very large, the maximum sum being twenty-five cents for each tree, but it is quite enough to make it worth while for farmers to preserve and transplant the young saplings which they find in the way of their agricultural operations, and a moderate annual expenditure would in the course of years produce results of immense importance. A little calculation will show that if the highest bounty were paid in all cases, a subsidy of fifty thousand dollars per annum would at the end of three years represent six hundred thousand young trees; or, supposing one out of every six to die, half a million of growing saplings, which, if planted only along the roads, thirty feet apart, would line them on both sides for a distance of fourteen hundred and twenty miles. Continued for fifty years, the same subsidy would have led to the planting of ten million trees, worth on an average five dollars apiece, all belonging to the persons who were paid for setting them out; but bringing in nevertheless to the public treasury in the form of taxes, supposing these to be reckoned at the moderate rate of one per cent, five hundred thousand dollars a year, or ten times the amount of the outlay. This is, of course, a rather summary way of calculating profits, but there is certainly reason for believing that in Ontario, and still more in this country, a movement of the kind suggested would be very judicious.

A CORRESPONDENT sends us a slip cut from a newspaper, which contains a hint apparently of great value to a certain variety of architects. The slip, which is cut from a denominational journal, seems to be an editorial article, affably mentioning the enterprise of a Mr. B. who has put forth a "list of new designs for churches." The plans are numbered from one to seven, and represent buildings ranging in cost from fifteen hundred to sixteen thousand dollars. One of the plans is, it seems, on exhibition in the editor's office, and we can readily credit his assurance that "it has a tower and belfry, and will certainly make a very handsome church." The singular feature about the matter is that the exhibition is not a gratuitous one, but one dollar is charged for the privilege of examination. If the plan is adopted, copies are furnished for five dollars, which "is certainly cheap," or would be so if it were not for the advantages which the blue process offers for the multiplication of drawings. Whatever may be the merit of the designs, which are probably quite worth the price asked for them, the idea of charging church-committees and other interested inquirers a dollar a head for looking at them is certainly novel, and if the ardor of such bodies in the search of means for circumventing the necessity of employing professional architects should turn to the advantage of the ingenious Mr. B, and his editorial friend, we should not be sorry.

WATER-CLOSETS. — VII.



HELLYER'S VALVE-CLOSET.—S. S. Hellyer, of London, received patents, in 1875, for a valve-closet in which the valve opened in a downward direction from the bowl. The bowl is attached to the receiver by set-screws, and the receiver is enamelled. The part of the valve which shows from the bowl is earthenware, under which, and with a larger diameter, is a disc of rubber, leather, or other pliable material, which has a seat against a metal rim, in this manner forming a water-tight joint. The rubber disc rests on a third disc of brass or some other suitable metallic substance. The valve is held firmly against its seat by the usual weighted lever, but the end of this lever, instead of being bolted so as to work on a fixed axis, is hinged or bolted to a spring. By this means the valve would be less liable to injury from violent jerks at, or careless dropping of, the hand-pull. The overflow enters the receiver behind the valve, and is supposed to keep this part of the valve and receiver clean. The receiver is ventilated, enamelled and small, being only large enough to permit the valve to work properly. The water is admitted to the bowl through a flushing-rim, and is taken from a special cistern, or directly from the water-main. In the illustration the supply-valve is connected to a waste-preventer, and is operated by a small adjustable stud attached to the hand-pull by a set-screw.

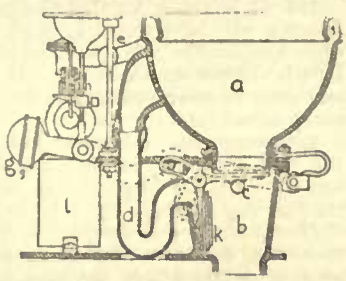


Fig. 69. — Hellyer's Valve-Closet.

a, Bowl. *b*, Receiver. *c*, Vent. *d*, Overflow. *e*, Supply. *g*, Weighted lever. *h*, Hand-pull and stud for opening supply-valve. *i*, Waste-preventer. *k*, Valve.

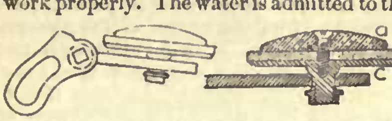


Fig. 70. — Detail of Valve. — Hellyer's Closet.

a, Earthen, or porcelain top.
b, Rubber, or metal disc.
c, Brass, or other metal back.

Underhay's Valve-Closet. — F. G. Underhay, of London, manufactures the Bramah, with slight changes. He also manufactures another simple valve-closet, in describing which he writes: "The bottom valve shuts against a ring of thick India-rubber bedded into a metal seating, effectually preventing leakage from unsoundness of valve, — the great drawback to the old valve or Bramah closet. A good flush of water is obtained, no matter how carelessly the handle is pulled up or suddenly let down. . . . As the connection is already made between the supply-valve and fan, but one joint is necessary in fixing these closets."

The simple U-shaped overflow enters the receiver, so as to face the valve when it is open. In the more costly closets of this kind are silvered-glass valves, hermetically sealed, so that a bright surface is seen on looking into the basin; also white, gold-lined, and fancy basins, cut-glass and ivory handles, with silver-plated dish and fans. This closet has been extensively used in England. In the illustration, one of Underhay's "air-valve regulators" is shown in position attached to the closet. This regulator will be described under the head of waste-preventers.

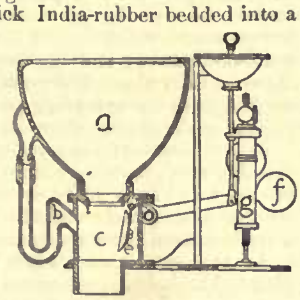
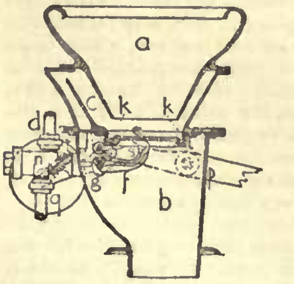


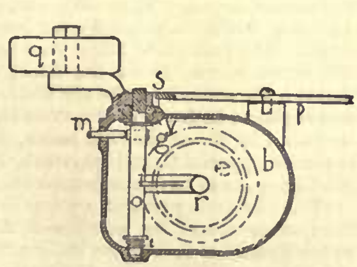
Fig. 71.

Underhay's Valve-Closet.

a, Bowl. *b*, Overflow. *c*, Receiver. *e*, Valve. *f*, Weighted lever. *g*, Brass regulator-valve. *i*, Ring of India-rubber.

Demarest's Whirlpool, Climax, and Acme. — Mr. John Demarest, of the firm of J. L. Mott & Co., New York, has been a prolific inventor of water-closet apparatus, and his closets have been extensively used in this country. He received letters patent from the United States for a valve-closet, and also from Great Britain for the same closet in 1876. J. L. Mott & Co. manufacture this closet under three names: "Whirlpool," "Climax," and Acme." The valve and its mode of working and the receiver are the same in each case. In the "Whirlpool" closet the bowl is placed in a metal hopper that is joined to and forms a part of the receiver or container, while in both the other closets the bowl is placed directly on the receiver, and held in place by metal buttons or strips bolted to the receiver, and projecting over a flange at the bottom of the bowl. In the "Acme" closet the bowl is attached to the receiver in the usual manner by set-screws. I quote the following from Demarest's specifications: —





Demarest's Closets.

Fig. 72. — "Whirlpool" Closet. Fig. 73. — Section of Receiver.

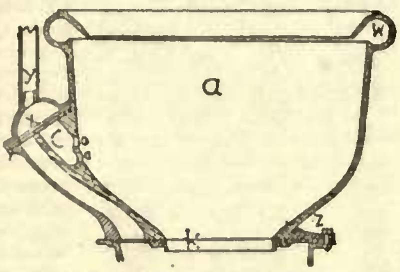


Fig. 74. — "Climax" Closet.

"The basin-valve is operated by an arm upon a weighted rock-shaft; the opening through which the shaft (or spindle) passes is rendered tight by a washer. The weighted arm of the rock-shaft is operated upon by teeth upon a lever which receives motion from an ordinary water-closet pull. The valve which admits water to the bowl is operated by a cam on the rock-shaft, and is provided with a cup leather piston and a spring to regulate the gradual closing of the spring. . . . The valve (at the bottom of bowl) is made of an elastic ring below the porcelain or enamelled surface. The weight on crank arm is preferably provided with a spring between the weight and its arm, to prevent concussion."

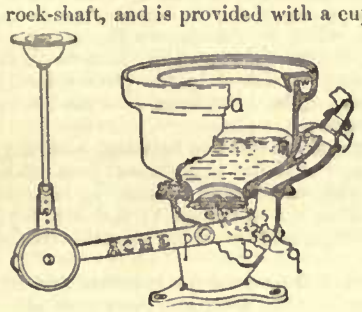


Fig. 75. Perspective view. — "Acme" Closet.

Demarest's Valve-Closets.
(Figs. 72, 73, 74 and 75.)

a, Bowl. *b*, Receiver. *c*, Overflow. *d*, Supply-pipe. *e*, Valve. *f*, Finger, or lever to support valve. *g*, Cam to open supply-valve. *i*, Rubber-ring. *k*, Metal-seat. *l*, Swivel. *n*, Supply-valve. *m*, Rod to operate supply-valve. *o*, Rock-shaft, or spindle. *p*, Weighted lever. *q*, Counterpoise. *s*, Toothed gearing. *r*, Spherical end of finger. *t*, Springs. *v*, Washer. *w*, Flushing-rim. *x*, Flap-valve. *y*, Vent to overflow.

In practice the weight is not attached directly to the spindle, as described in the specifications, but is placed at the end of the lever, which is connected with the hand-pull. (Figure 75.)

The overflow in the "Whirlpool" closet is between the bowl and the hopper in which the bowl is set; while the "Climax" and "Acme" have the greater part of the overflow moulded on the bowl. A bent pipe enters the overflow at its crown, and is intended to carry off any gases generated in the receiver and prevent the trap of the overflow from being siphoned. The overflow of the "Climax closet" has a flap-valve as an additional protection against gases entering the room through the overflow. This flap-valve was probably added because of Dr. Fergus's experiments on the permeability of water-traps; while Dr. Carmichael's experiments on the same subject at a later date have caused the manufacturers to leave it out of the "Acme" closet. The "Climax" and "Acme" closets both have flushing-rims which differ from each other in their form.

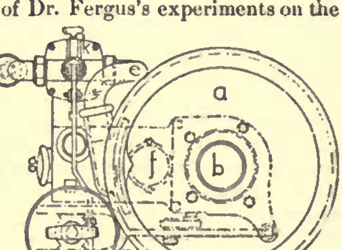


Fig. 76.

Top View. — Jennings's Valve Closet.

a, Bowl. *b*, Valve. *c*, Receiver. *d*, Vent-pipe. *e*, Supply. *f*, Ball-valve. *g*, Opening for lavatory waste. *h*, Overflow. *i*, Lever for supply-valve. *k*, Waste-preventer. *l*, Fan.

Jennings's Valve-Closet. — J. G. Jennings, of London, invented a valve-closet which was patented in this country in 1880, having previously received letters patent from Great Britain in 1878. This closet Jennings claims as an improvement on the Bramah. The bowl, supply, receiver, vent-pipes, and manner of working the valve have nothing new in them; the principal novelty is in the arrangement of the overflow. The valve was invented by Jennings in 1868. The overflow empties directly into a U or half-S trap, in which there is a bell opening for a lavatory or bath waste (this is claimed as a novel feature). There is a ball-valve in the overflow which has its seat on a sharp metal ring. This ball would take and keep its seat by the action of gravity, being raised only by water coming into the receiver, and backward pressure either of water or gas would only tend to make the ball fit more tightly, unless some foreign substance should get between the ball and its seat. To prevent waste matter entering the overflow, the valve at the bottom of the bowl, when open, closes the outlet of the overflow into the receiver. The receiver is properly vented.

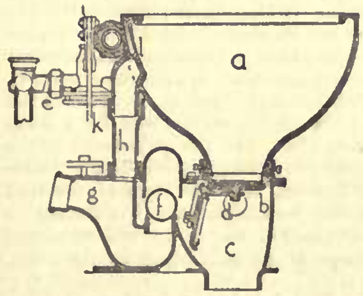


Fig. 77.

Section. — Jennings's Valve-Closet.

PAPERS ON PERSPECTIVE.—XIX.

THE INVERSE PROCESS.

IT is sometimes desirable to invert the procedure described in the preceding chapters. Instead of beginning with an orthographic plan and elevation, deriving thence a perspective plan, and then finally arriving at a complete perspective drawing, it is often possible by a reverse process to derive the perspective plan and elevation from the drawing, and from them to obtain the actual shape of the object, and its relations to the spectator and the plane of the picture. Its dimensions can also be determined if the dimensions of certain lines in it are known.

Photography has given to the discussion of this subject an importance which it did not previously possess, for it is often desirable to obtain from the perspective view taken by the camera the real proportions or dimensions of the objects shown. This is sometimes impossible, sufficient data not being furnished by the picture itself, and no other information being accessible. But when it is possible it is not difficult, as I shall endeavor to make plain.

380. To effect the interpretation of perspective drawings with any approach to precision it is necessary that the perspective lines shall make a sufficiently large angle with each other or with the horizon clearly to indicate the position of the vanishing-points; that is to say, the object shown must either be large, near at hand, or considerably above or below the eye.

381. If the object is in oblique, or three-point perspective, and its three vanishing-points can be fixed with precision, there is no difficulty, as has been shown in treating of that subject, in determining the position of the spectator. This fixes the centre of the picture, the station-point, the distance of the station-point from the centre and from each of the vanishing-points, and all the points-of-distance. For lines connecting the three vanishing-points represent the three horizons, and the meeting-point of the perpendiculars let fall from the angles of the triangle thus formed upon the opposite sides, is the centre C; the distance of the station-point in front of this point, and its distance from each of its vanishing-points, is then easily determined (168), and the points-of-distance found. If, then, the length of any of the vanishing lines is known, a line of measures parallel to one of the horizons can be drawn through one of its extremities, its true dimension according to the scale of the drawing, or of that part of it, found by means of a point-of-distance, and the scale of the drawing and the dimensions of every other part ascertained.

382. This is illustrated in plate XXI., Figure 110. If we suppose the perspective of the rectangular block to be given, the vanishing-points V_L, V^M, and V_O, and the traces that connect them, can be obtained, the ground-lines, or lines of measure *o m*, *l m*, and if necessary *l o*, drawn, and the relative dimensions of the edges determined. Whether the block is large or small cannot of course be learned. The size of the miniature block, supposed to be in contact with the picture at *a*, is determined, its edges being equal to *a l*, *a m*, and *a o*; but there is no means of knowing how much larger the block itself is than this miniature representative. To determine this we must know either the actual dimensions of one edge of the block, or the distance of the block behind the picture. Neither of these can be shown by the picture itself.

383. If the object is drawn in two-point, or angular perspective, as is generally the case, it does not suffice for the determination of its shape, position, and relations to the spectator that the vanishing-points of its principal lines should be known. For fixing two vanishing-points does not, as fixing three does, determine the position of the spectator and of the centre of the picture, and thence of the points-of-distance, nor does it determine the *attitude* of the object, or the angles its sides make with the plane of the picture. Fixing the vanishing-points only restricts the *locus* of the spectator's position to the semi-circle subtended by the line joining them; they determine neither the attitude of the object nor its shape. In Figure 111, for instance, we have at A and B the same perspective and the same vanishing-points. But at A the station-point, S, and the centre, C, are assumed to be well over towards the right, and at B, towards the left. The perspective plans and the elevations derived from them are shown below. The plans are alike, but the points-of-distance being different the dimensions found upon the ground-lines are different, and the proportions of the building and the slope of the roof come out differently. But while the buildings, though differing in size and shape, are alike in perspective, the doors and windows, which are of the same size and shape in one building as in the other, come out differently in perspective.

384. In order to interpret correctly a drawing made in angular, or two-point perspective, it is necessary to have definite information as to the position either of the centre, C, of the vanishing-point at 45°, V_X, or of one of the points-of-distance, D^R or D^L. The centre is generally nearly in the middle of the picture, but that it is exactly there is not to be taken for granted. Its position is often precisely indicated, however, by some secondary object, which is drawn in parallel perspective; and it is always a good rule to introduce some such object as the pile of boards in Figure 111, A, as a guide to the spectator.

385. It often happens, however, especially in architectural drawings, that the nature of the subject is such as to furnish diagonal lines lying at 45° with the principal directions, lines that we have called X, dividing the angle made by the lines R and L. Figure 112 shows, by means of a little elementary geometry, how in this case the station-point, S, is to be found, V^R, V^L, and V^X being given. As the angle, V^R S V^X, is an inscribed angle of 45°, its sides must include an arc of 90°. A line drawn from *x* in the figure through V^X to the opposite circumference fixes the position of S, and hence of C, D^R, and D^L.

386. It is not often that the position of either of the points-of-distance can be detected by mere inspection of the picture; but it often happens that the real or proportional dimensions of some of the lines in the picture are known. In that case one of the points-of-distance can be ascertained, and the other elements of the problem then easily determined.

Let us suppose, for instance, in Figure 113, that the rise and tread of the steps are known to be six and twelve inches. A line of equal measures, *l r*, laid off parallel to the horizon, from the front edge of the first step in length equal to twice the vertical edge, forms, with the horizontal line in perspective and a third line joining their further ends, the three sides of an isosceles triangle. The vanishing-point of the third line, the base of the triangle, gives the point-of-distance D^R. The distance from this point to its corresponding vanishing-point is the distance of the station-point from that vanishing-point; that is to say, $D^R V^R = V^R S$.— S, which must lie somewhere in the semicircle of which $V^L V^R$ is the diameter, — is then easily found, as in the figure. C, D^L, and V^D, immediately follow.

387. When the drawing to be interpreted is made in parallel perspective it is generally easy enough to find the centre of the picture, the vanishing-point of the lines perpendicular to it. But, as in the previous case, it is impossible to tell what is the real shape of the objects represented, or to know from what distance the picture should be looked at, unless the real shape of some one of the objects is known independently. If Figure 20, for instance, Plate VI, is looked at from a point about three inches in front of C, as may be done by looking at it through a pin-hole, so as to obtain a clear image on the retina, the little pavilion represented looks about square, the steps on the side seeming very steep. Seen from a distance of several feet it looks two or three times as long as it is wide, and the steps seem of very easy grade. The posts at the corners are presumably square, and the lines of the pavement and of the hips of the roof, in plan, are presumably directed to the vanishing-point of 45°, which is the point-of-distance; and the steps have presumably the same slope as those on the right. The point-of-distance can be found by the same method as in the preceding paragraph, and the true shape of all the objects in the picture determined.

388. Of course these results are based upon the understanding that the objects represented are rectangular. If the lines that define them are known to form acute or obtuse angles, instead of angles of 90°, the line joining their vanishing-points must be treated as the chord of a circle instead of as a diameter, as is done in Figure 114.

At A is shown an obelisk in perspective, presumably square in plan. The methods described in the previous paragraphs suffice to determine successively the principal vanishing-points, V^R, V^L, and V^X, the centre, C, the points-of-distance, D^R and D^L, and a perspective plan. The dimensions can then be determined, according to the scale of the drawing, and that scale may be determined if any one of the dimensions is known.

At Figure 114, B, is another drawing, the horizontal and vertical lines of which are identical with the first. But this obelisk is understood to be triangular and equilateral, with angles of 60° instead of 90°. A perspective plan, with the vanishing-points V^R and V^L, are easily determined, as is also V^X, the vanishing-point of the line bisecting the solid angle in contact with the picture. These elements suffice to determine the orthographic plan, Figure 114, C. As the angle at the station-point, S, is only 60°, in place of 90°, it is included in an arc of 240°, the point S lying somewhere in that arc, which is its *locus*. The point V^X, however, enables us, as the point $V^{X'}$ did in the previous case, to fix the exact position of S, by drawing a line through the summit of the arc at X, and the point V^X. If then the eye is placed in front of Figure 114, A, opposite C′, at the distance indicated by S′, on the plan below, the obelisk will look square; if it is placed opposite C, in Figure 114, B, at the distance indicated by S, it will appear to have the section of an equilateral triangle.

389. The little pyramid on top is, however, differently drawn in the two cases, and the position of the apex suffices to show that the upper figure has four sides, the lower but three. The angles at which these sides meet, however, is necessarily intermediate.

390. The fact that acute or obtuse angles can thus be interpreted as right angles makes it difficult to represent them satisfactorily when there is nothing else in the picture to guide the judgment. It often happens in the case of buildings situated where two streets meet at an odd angle that drawings of them look as if the buildings were square. To obviate this it is necessary, as has been said, to introduce something which is unmistakably rectangular, such as an awning or chimney or a cart backing up to the sidewalk, like the pile of boards in Fig. 111, A.

391. If it were not, indeed, for the facility with which the mind

thus gives the most reasonable interpretation to the phenomena that meet the eye, even the right angles shown in perspective would generally look either acute or obtuse, since it is only when the eye is exactly at the station-point, or rather when it is on the circumference of a semicircle lying between the vanishing-points, that the angle really looks as a right angle would. But these distortions, like the other distortions that arise from abandoning the station-point, are made light of by the intelligence. It is only in the case of circles, cylinders and spheres that one is disturbed by them. In those cases, indeed, remaining at the station-point hardly suffices to reconcile one to the drawing, as has been explained.

FROM BAYREUTH TO RATISBON. — NOTES OF A HASTY TRIP. — IV.

I WILL not say that the interior of the Bamberg Cathedral is as delightful as its exterior. Of course there are plenty of tourists who never really *see* a church at all; but with those who do have artistic sympathies there are, I find, two very distinct ways of looking at mediæval buildings. Some few eyes care most for the actual architecture itself, others — and these by far the majority amongst travelling non-professionals — care only for the architecture as a means toward an effect. It is the *effect* of an interior — its picturesque as distinguished from its strictly architectural features — which appeal to them. Color, light, the action of time, and the thousand and one objects of art and history which, when a church has been undesecrated and unrestored, have accumulated through the lapse of centuries, often play the most important part in this effect. Its beauty is sometimes secured, indeed, with architectural elements that are far below the best. For example, I know of no more entrancing, beautiful, picturesque interior than that of the *Lorenz Kirche* in Nuremburg, the architecture of which is not remarkable beyond that of a dozen other churches which have not half its fame and which do not produce a tithe of its effect upon the sense. And the cathedral of Ratisbon, which sins architecturally in a hundred ways, is *pictorially* far more delightful than many almost perfect structures. He who seeks for this pictorial beauty will, I acknowledge at the outset, be disappointed at Bamberg. An artist might not choose to paint any corner of it; no emotionally sensitive person will be stirred by its aspect as such a one must be by the aspect of the Nuremburg church or the Ratisbon cathedral. Nor is it large enough to impress one by its mere size. The want of the pictorial element depends partly on the fact that the interior having been "Jesuitized" and abused to the farthest possible extent, was — about forty years ago, I think — cleared of its horrors and restored as nearly as possible to its primitive condition. As in every such case the resultant effect is cold and rather bare. Yet, though one infinitely prefers the time-worn aspect of churches like St. Lawrence, where beautiful, congruous details have gathered and where color has mellowed, yet no one who has ever seen an interior that has been worked over by the decorators of the seventeenth or eighteenth centuries into accord with their own ideas of architectural fitness can deny that in such a case the very extreme of coldness and barrenness, even the most unsympathetic "restorations" of this century are an immense improvement. They may leave not a scrap of pictorial or decorative beauty behind them, but they at least restore the structural features to sight. And these are concealed by the inventions of the so-called Jesuit decorators to an extent which makes many a Romanesque church to-day undistinguishable from a round-arched late Renaissance building.

But even had Bamberg never been either barbarized or restored it would not have had the picturesque charm of many of its later sisters. The earlier style was so much more severe, so much more solid and simple, had so much less of detail and of mystery, that its effects could never be quite so picturesque; but to the other class of observers I have mentioned — those who care for architectural features proper — this interior is most interesting. All along I have called the exterior of the church Romanesque although "Transitional" would have been the orthodox word; but although one finds pointed arches enough when one stops to look, their effect does not really alter the eminently Romanesque effect of the exterior — even of the western towers, which are much later than the others. Yet with all their openness and their groups of pointed arches they do not seem to me in *feeling* in the least akin to Gothic. And of the interior I think almost as much may be said, though pier and vaulting arches are alike pointed, and though the western apse has very high narrow windows and acutely-pointed vaulting, which is almost Gothic in feeling; but the rest of the church is not, in spite of the entire lack of round arches. The vaulting of the nave is supported by alternate piers, those which thus serve being supplied with pilaster vaulting shafts; but even this arrangement does not Gothicize the great arcade with its immense mass of heavy plain wall above. There is no triforium and in each of the spaces but a single small round-headed window high up under the vaulting. These walls must of course have originally been painted and the vaulting likewise. An old colored drawing is said to be in existence which reveals the scheme, and in cleaning the church traces of the original color were found under the repeated coats of whitewash. These are most distinct in the cells of the vaulting of the western apse. They consist chiefly of conventionalized patterns in dull red and yellow, but it is said that they also show some small figures, which though much faded are valuable as being almost the only survivors of the wall-painting of this period in all Bavaria — for they are supposed to date as far back as the building of this later portion of the church — the end of the thirteenth century.

The arrangement of the two choirs greatly detracts from the apparent size of the church. Their pavement is raised many steps above the level of the nave, and they project far into the body of the church. Each choir is equal in length to two of the great square divisions of the vaulting, while the space left in the middle of the nave is only equal to three. The transepts are at the west, not at the east, and are cut in two by the projection of the western choir. Thus from either transept or from the east ends of the aisles, one's view is obstructed by the side of the choir which rises higher than one's head. The effect as of a long nave is entirely lost and with it goes some of the general ecclesiastical feeling. There is no centre of interest in any church with double choirs and apses, and the fault is most conspicuous here, where both choirs have been made so very prominent and both are so nearly equal in importance. Yet with all its drawbacks it is an imposing interior — grand, if not picturesque, and stately if not graceful; and especially interesting, as I have said, as proving how much Romanesque feeling may remain where scarcely a single round arch is in sight.

I doubt very much whether there is a single church in Germany that can rival Bamberg in the matter of sculpture — not of decorative but of truly representative work. The statues and reliefs of the exterior I have already noticed very briefly. Those on the inside are quite as remarkable and of greater number and variety. Along the sides of the eastern choir are rows of niches containing remarkable figures of apostles and prophets. These date from the true Romanesque days, while from the later, transitional time which produced the exterior adornments already described, come numerous large portrait-statues which are affixed to the walls of the nave. The most interesting is an equestrian statue now believed to be of Otto the Third — though there is of course a much more agreeable local legend which makes it that of some half-heathen visitor from the East who rode into the church on horseback and suffered in some way for the sacrilege. From this same period come also many splendid gravestones and brasses; and the series of these runs on into latest Renaissance days, showing all the vicissitudes of the art and every possible variety of treatment, from the most elaborately-executed figures in high relief down to mere outline incisions cut into the slab. The carved wood stalling of the western choir is very elaborate, containing hundreds of small figures — oddly enough most of them being knights in armor. This stalling dates from the beginning of the fifteenth century. One of the chief monuments in the church is that of Bishop Suidger of Bamberg who afterwards became Pope Clement II. With this we go back again to the transitional period between Romanesque and Gothic. It is a remarkable work, a sarcophagus of marble, covered with small reliefs. On top lies the figure of the pope, still youthful in his death, while an angel approaches to comfort him. Another most important work — one which, though late in date, is perhaps the centre of our interest, both on account of its artistic worth and of the persons it commemorates — is the great sarcophagus which stands just in the centre of the edifice, and was erected in the beginning of the sixteenth century (1499-1513) in honor of the founders of the church, Henry and Kunigunde. It is composed of limestone which is, however, almost as close and susceptible of fine workmanship as true marble. The artist was Riemenschneider — a name unfamiliar, I fear, to most of my readers, but which quickly grows in familiarity and honor when one travels a little out of the beaten track in southern Germany. Usually working in wood, though sometimes as here in stone, Riemenschneider deserves to be placed only just below such sculptors as his neighbor artists Adam Krafft and Peter Vischer. On this tomb he has carved the life-size recumbent figures of the imperial pair under a florid canopy, and surrounded the sides of the sarcophagus with reliefs depicting scenes from their lives. The most curious of these is the one where the empress is walking over hot ploughshares in order to prove undeserved her husband's jealous suspicions. Even such thrice-saintly couples seem not to have lived in peace in those troublous times! The empress's expression of conscious innocence as she daintily steps over the irons is wonderfully amusing, but not more so than the gesture with which Henry lifts his hands as though to say "To think that I could ever have suspected such a saintly being!" It must not be supposed, however, that this work of Riemenschneider's has any affinity with the grotesque dramatic force of earlier days. It is extremely refined and artistic in idea as in execution, and only a

subtile suggestiveness in face and gesture prove him akin to the rougher, more naively and grotesquely imaginative members of his guild.

It is impossible here even to name all the other ecclesiastical buildings in Bamberg which might claim a student's notice. Most of them are horribly disfigured by the late additions and decorations, and many are prostituted to other uses — chiefly military. Henry II himself was a good soldier, but I wonder what he would think to revisit his foundation and see these buildings serving as barracks with their original titles attached — to hear the name, for example, of the "Holy Sepulchre Barracks," or the "Carmelite Barracks" — these last once the home of a sisterhood of nuns, part of whose fine cloister still remains. One of the oldest buildings is the church of St. Jacob, a flat-roofed basilica built between 1073 and 1109. The most beautiful I should call the *Oberepfarrkirche* — that is as far as its choir and apse are concerned. The main structure is small and is plain Romanesque; but the disproportionally large and splendid east end dates from the middle of the fourteenth century and is very French in style. The polygonal apse is surrounded by chapels and its exterior arrangement is very beautiful. Inside, unfortunately, though one may still pass around the aisle and see the lower part of the work close at hand, no general view is possible. Behind the altar rises one of those huge structures of wood, stucco, paint, and gilding such as only an eighteenth-century priest could have devised. With its flaunting plaster angels and crosses and gilded rays of glory and crude, glaring colors it entirely blocks up the apse so that its effect cannot be in the least perceived. The north doorway with a baldachino supported by columns is interesting; and inside the church there is a curious madonna-figure of very early date. As the church stands on one of the steep hills which diversify the level of the town its beautiful apse is a prominent object from many points of view.

The *Michaelskirche* with the many buildings connected with it is of much interest to the historian but not of great present value to the architectural student. Founded by the same emperor that founded the cathedral, and rebuilt by the same Holy Otto, much of the later structure remains; but surely no one could guess that the great pier arches were earlier than the so-called decoration which now covers them. Though these usual wood and plaster arrangements must be earlier, I think that the actual frescoing of the building must date from the beginning of our own century. I can imagine no other period when decorators would not have been at least more ambitious. Fancy over the walls and vaulting a coat of whitewash sprinkled over with detached leaves and flowers, here and there a parrot or a dove sitting on a spray — all distributed in the most ludicrously childish way without plan or design. It looks as if it had been done by an artist in work that amused our own youthful days under the name of "*décalcomanie*."

This church was only a part of the great foundation of Henry II — the famous Benedictine Abbey which he established, and which did such good service not only in evangelizing the neighborhood but in fostering the minor arts. Only the façade of the church is visible ("Jesuitized" of course), as it is flanked on either hand by other buildings. These also form two more sides of a quadrangle upon which the church looks down. They are now put to various municipal and artistic uses, and contain among other things a gallery of old pictures that is perhaps the dreariest, barrenest and most totally depressing to be found in all Europe. At least I can imagine none other of equal extent contains so few canvases before which one could be induced to pause. A couple of Tiépolos are all that I remember to have seen.

The library and print collection, however, are in very different case. These are housed in a more modern building in the centre of the town, and include some 2,600 manuscripts and 200,000 printed volumes, besides the Heller collection of 300,000 prints and drawings of every description. Days and weeks might profitably be spent in examining these treasures, some of which are of the extremest rarity and beauty — among them the splendid prayer-books of Henry and Kunigunde, missals with carved ivory covers, and various illuminated writings of the far-away Carolingian time. In the treasury of the cathedral are more magnificent works — missals with carved and gem-set covers, ivories of all descriptions, embroideries, and goldsmiths' products. The town seems to have been, as I have said, a centre for the workers in the minor arts during many centuries, schools for this purpose having indeed been founded by Henry II, under the control of the Benedictines. Not only in the place itself but all through Bavaria, as far south as Ratisbon and Munich, we meet with countless treasures known to have been wrought in Bamberg. Some of the most beautiful objects were gifts from the imperial pair. These of course must have been produced in other places. A portrait of Henry in his royal robes, seated on the throne, surrounded by all sorts of dignitaries, which figures as an illustration in one of the missals, is not only interesting in other ways but curious as proving that painters in every age have been alike in their travesties of current architectural forms. The columns with large masks which support a roof from which hangs a curtain behind the throne have, so far as I know, no prototypes in actual constructions. A life of the emperor dating probably from the eleventh century is illustrated with odd but expressive pen-and-ink sketches.

The visitor to Bamberg will be told by every citizen that the most important of all things to visit is the "Altenburg." If not very wise he will employ in following this advice precious time that might be better spent. If he has time to spare, however, and a good pair of legs of his own, he will be justified in making the four miles there on foot; but I do not think the visit is worth the exorbitant price he will be charged by a hack-driver. The road is very pretty and the distant view of the cathedral is worth while; but the Burg itself is merely one of those ancient defensive structures with keep and chapel such as are found all over Germany. It is very old but its date is not known and it presents few really architectural features.

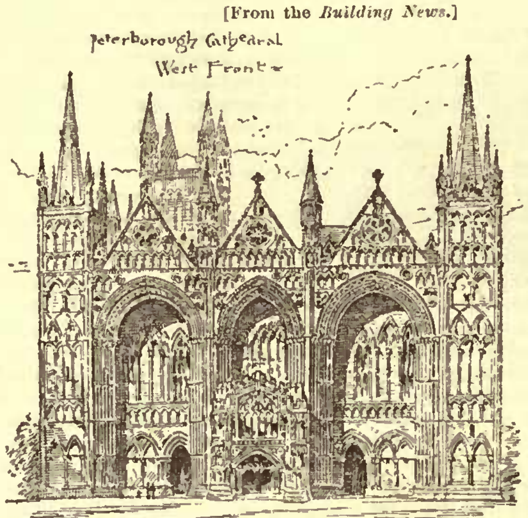
I will conclude with a citation from a local chronicle which shows the terms upon which old-time architects undertook their labors. Hans Forscheimer was named city architect in 1452, with the obligation to supervise all the wood and stone buildings of the town as well as inspect its pavements. He might undertake no building in other places, but he was not to be obliged to put his own hand to any actual work except upon payment of what is curiously called "special drink-and-bath money." For these services he was to receive free lodging for himself and his wife, with exemption for both from local taxation, and for him from service as night-watchman, public laborer, or soldier. And he was to receive £35 a year in money and £8 additional for the exercise of certain duties which seem to have been those of inspecting the condition of buildings already constructed. This Forscheimer was the architect of the Rath-Haus and of the principal bridge.

As in almost every German town there is a good local hand-book of the antiquities of Bamberg. It was apparently out of print when I was there, but can undoubtedly be secured by more fortunate future visitors. M. G. VAN RENSSELAER.

THE ILLUSTRATIONS.

PETERBOROUGH CATHEDRAL.

[From the *Building News*.]



THE history of Peterborough, like that of Gloucester, Westminster, and several other of our cathedral structures, is that of a great Benedictine monastery church, converted by Henry VIII into one of his new cathedrals. The narrative of its rise carries us back into the uncertain mists of the seventh century, when Prince Oswy, ruler of Northumbria, and Peada, son of the King of Mercia, are said by the Saxon chronicle to have met (in 655) and agreed to rear a minster to the glory of Christ and the honor of St. Peter. The monastery is believed to have been the first established in central England. It and the fen-land town which it adjoined were known for more than four centuries afterwards as Medehamstede, its present name of Peterborough being a comparatively modern appellation. A very large portion of the building is of Norman character, gradually advancing to Early English from the east end of choir to the west end of nave. The unparalleled west front, pronounced by Ferguson to be the grandest and finest portico in Europe, is of the purest type of Early English work, while the chapel, inserted into the central arch of this porch, and the great retro-choir or "new building" at the east end are Perpendicular. The entire building is constructed in a close-grained and durable freestone from the neighboring quarries of Barnack, by Stamford. The old monastery church having been destroyed by fire, Abbot John de Seez commenced (1118–25) the present choir which was completed by the next abbot but one, Martin de Bec, 1133–55. The eastern end, like the slightly later one by Herbert de Losinga, at Norwich, is apsidal, and is inclosed by the "new building." To this pure Norman period belong the eastern arches of both transepts, the rest being the work of Abbot de Waterville, 1155–77, who built the central tower as a lantern of four stages. Insufficient means were taken, however, to ascertain whether the foundations and piers could bear the weight — a very common negligence with architects of the twelfth century — and in consequence of the impending failure of the piers, the lantern was taken down nearly as far as the crowns of the great arches; the east and west arches were altered from semicircular to pointed, but the Norman arches opening into the transepts still exist. Pointed hoods were inserted above these two round arches, in order to remove the weight from their crowns, and the original Norman columns and capitals were left, although adapted to the new work. The lantern now being demolished appears to have been built about 1340, and has two lofty windows on each side, filled with Decorated tracery, and between and beyond these on the exterior is a blind arcade richly treated. The nave was commenced

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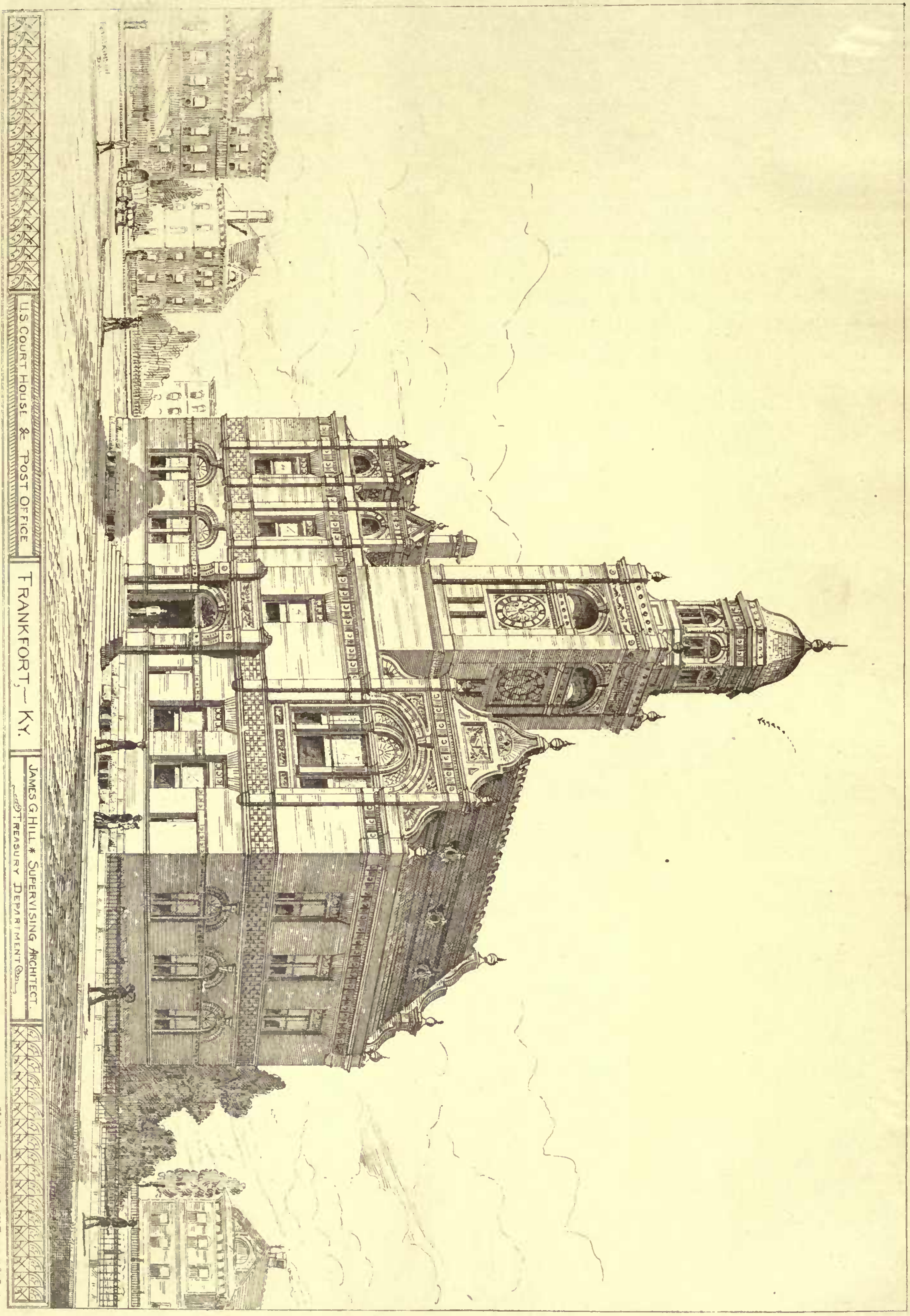

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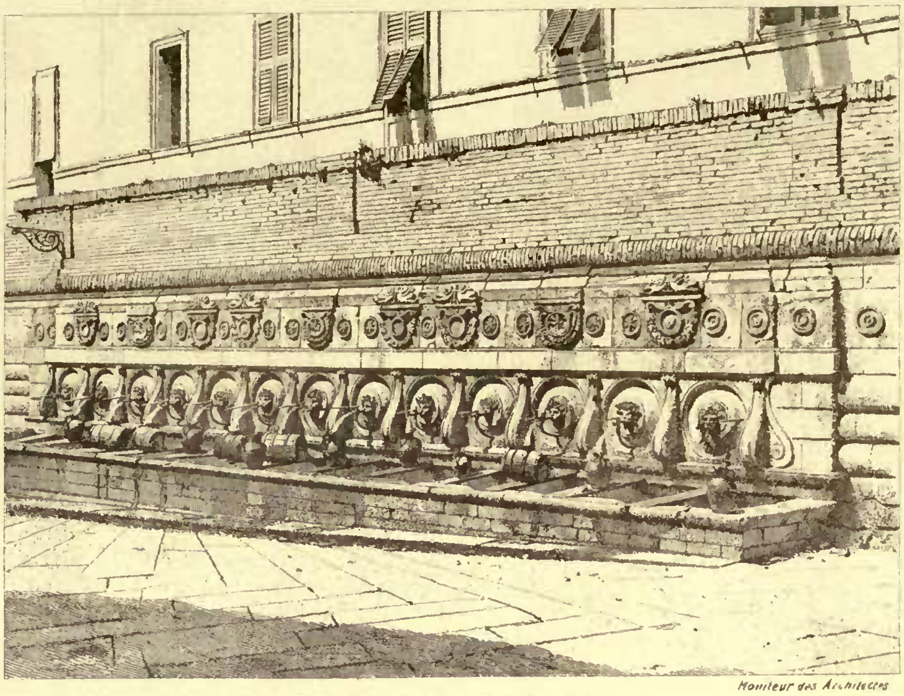


Moniteur des Architectes

FONTAINE AUX TREIZE CANELLES A ANCÔNE

TOMB OU

OUR FOREIGN EXCHANGES. XIII

ENCYCLOPEDIE D'ARCHITECTURE

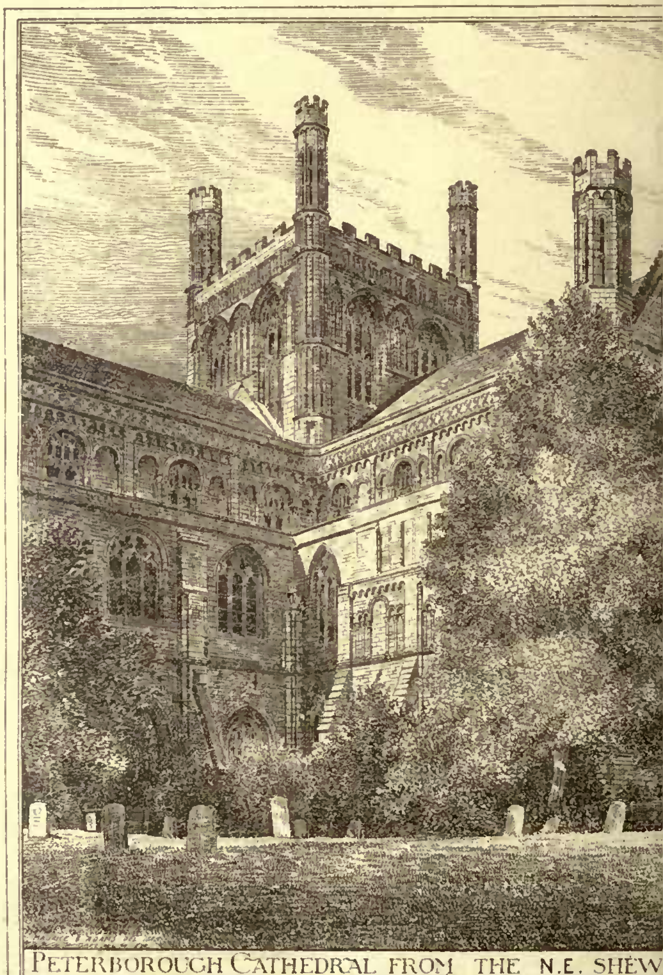
ARCHITECTURE — PL. 833

Echelle de — Metres

Pierre Degre del — F. Penel sc.

EGLISE SAINT PHILIBERT DE DIJON

PORTAIL LATERAL



PETERBOROUGH CATHEDRAL FROM THE N.E. SHEW

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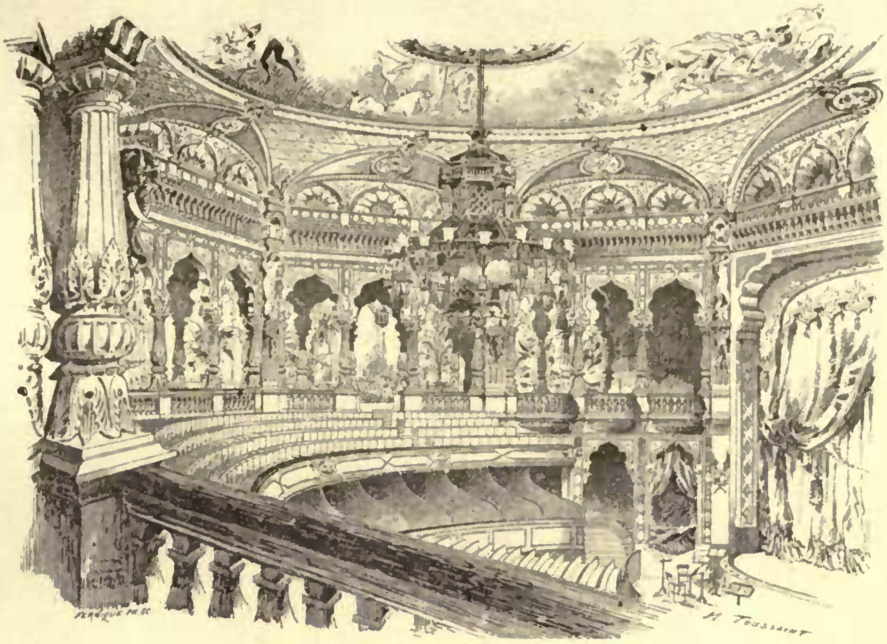
CAIRO. *The Builder*

NOUVEAU THÉATRE A PARIS



L'ÉDEN-THÉATRE, RUE BOUDREAU. — Architectes : MM. Klein et Duclos.

LA SEMAINE DES CONSTRUCTEURS.

THE CENTRAL TOWER NOW BEING DEMOLISHED 1883

THE BUILDING NEWS

NOUVEAU THÉATRE A PARIS

L'ÉDEN-THÉATRE, RUE BOUDREAU. — Architectes : MM. Klein et Duclos.

LA SEMAINE DES CONSTRUCTEURS

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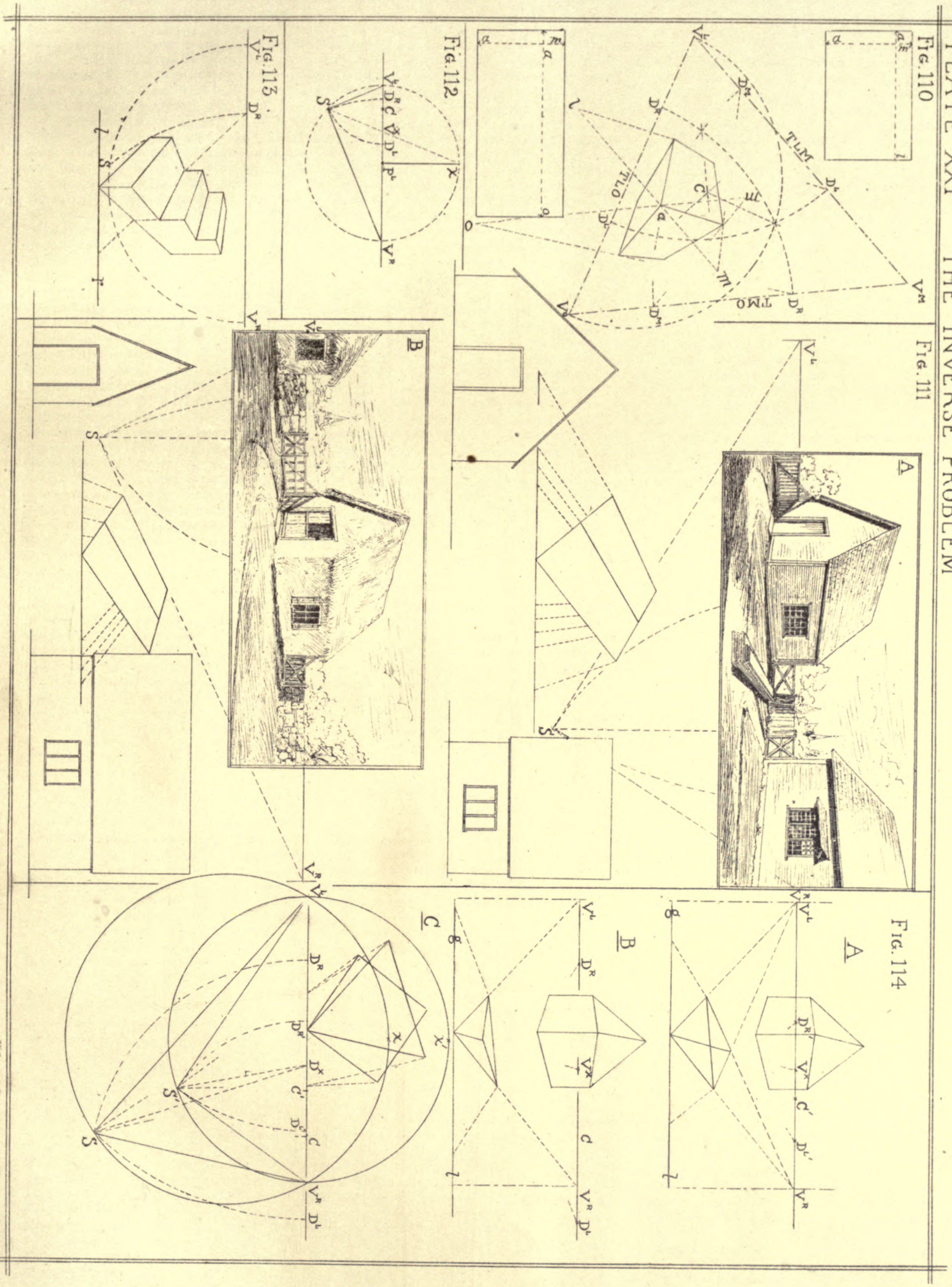

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by Abbot de Waterville, and was carried westwards by Benedict, 1155–93, and has often been compared with the neighboring and nearly contemporary naves of Ely and Norwich. It is slightly later in style, and considerably longer, wider, and loftier than either of those, while the effect is more massive. At the west end are Transitional western transepts, and beyond these the rich thirteenth-century west façade already referred to. Inclosing the ancient apsidal end of the choir is the "new building," a long parallelogram of five bays, forming a third transept, like the much earlier eastern one built at Durham. It was built between 1438 and 1528, and is covered-in with rich fan-vaulting, flatly treated, without pendants.

Evidences of weakness and instability have for many years shown themselves in the masonry of the central tower, and fresh proofs of their existence have frequently been the cause of much anxiety to the Dean and Chapter, although Sir Gilbert Scott's recommendations as to the necessity of dealing with the dangerous character of the structure were, from time to time, set on one side, either for want of funds or for want of energy. "For a very long time," he writes, "the Chapter (with one brilliant exception) did all in their power to shut their own eyes and those of the public to the truth, and called in another architect, who preached 'Peace, peace!' They sent for a third, and he at first was almost carried away by their dissimulation, but at last was obliged to admit the danger." Considerable expenditure was then undertaken in underpinning the north aisle of the nave, under the direction of Sir Gilbert Scott; but the general subsidence of the building towards the north had considerably increased the weakness of the tower, which had also suffered through the vain endeavor, made many years before, to hold up the south transept front from leaning outwards by strapping it to the tower walls by means of ties formed of large beams, which are laid in the passage-ways of the triforium and clerestory on both sides of the transept. The sinking thus sought to be remedied has continuously gone on notwithstanding, and consequently the rents in the tower have gradually grown worse. This critical condition of the lantern was rendered the more serious by the failure of one of the four great piers which carry it. The pier, that at the southeast angle, is split, more or less, from the top to the bottom, being only held together by wood-work and numerous iron bands; but in the pillar itself the evidence of settlement is not so distinctly marked. The foundations at this point do not seem faulty, for the pier from the ground-line to the organ-gallery level shows no actual settlement. Above this level the compression increases upwards, showing that the failure of the column is chiefly due to the crushing of the rubble core. The north aisle of the choir, long in a sadly decrepit and sinking state, had to be shored with timber, while the foundations throughout the cathedral were of the most faulty description. The site itself is a bad one, owing to its extremely water-logged nature. Indeed, the Chapter just now have to contend with difficulties of no usual character, and the agricultural depression throughout the diocese at the present time is likely to somewhat cripple their already limited resources.

Sir Gilbert Scott, in Dean Butler's time, underpinned parts of the church towards the northeast, and, later on, he did the same to the eastern aisles of both transepts, also adding buttresses to them. Some of the Chapter wanted to go beyond Scott's ideas by building flying buttresses against the north wall; but ultimately this proposal was abandoned, and the matter has been allowed to remain in abeyance. The successful underpinning of the towers and rebuilding of the weak piers of their substructures at Ripon and St. David's, as well as, later on, at St. Albans, carried out by Sir Gilbert Scott, furnished experience and examples well suited for the remedying of the causes for alarm at Peterborough; but limited resources are pleaded as the reason for delay. Early in the autumn of last year, the Dean and Chapter consulted Mr. J. L. Pearson, R. A., as to the condition of the central tower, and subsequently (early in November) his report was printed and circulated in the diocese. An influential committee was formed, headed by the Marquis of Exeter, to carry out the recommendations of the report, and early efforts were contemplated for obtaining the funds necessary for rendering the central tower secure by rebuilding the southeast pier. Mr. Pearson does not seem to have considered the danger so imminent as circumstances have since proved it to be. A day or two after Christmas fresh cracks were observed and old fissures were enlarging, portions of stone were dislodged, while the whole upper stage of the tower, long ago much shattered, seemed to be moving towards the north. Mr. Pearson was summoned by telegram to make a personal examination, and on the first day of the new year he unreservedly condemned the tower as unsafe, and recommended that the choir services should forthwith be discontinued, as it was, in his opinion, quite impossible to say when or how the state of movement in which the tower was might not be seriously accelerated. He further advised that the whole, or nearly the whole, of the upper portion of the tower should be speedily removed, in order that the arches of the crossing and their piers might be at once relieved of as much weight as possible, and also to prevent any of it giving way suddenly and cutting through the roof to the floor below. Mr. Pearson expresses extreme regret in this report that so complete a demolition should be necessary, but adds that the recently-increased settlements leave no choice in the matter. Early on Tuesday, the day after these recommendations had been received, by the instruction of the Dean, a large body of workmen were engaged in screening off the tower from the nave, and in the necessary preparations for fitting up the western portion of the nave for divine service, this work being entrusted to Mr. John Thompson, of Peterborough, the builder who restored Chester and carried out the work already referred to at Ripon. The same contractor is now engaged in taking down the central tower, under the immediate supervision of Mr. Pearson, he also having underpinned the north aisle of the nave for Sir Gilbert Scott. Blore's screen, erected in 1830 across the entrance to the choir, will be removed as soon as the other work necessary to be done will allow; but it is contemplated that at least a month will elapse before this organ-screen can be taken down. The organ has already been removed, and has been re-erected in the north aisle of the nave. A platform of wood has been placed across the tower, about fifty feet from the top, where stones of considerable size have become loose, some having broken away altogether. The stone pulpit erected in memory of Dr. James, a former canon of the cathedral, has been removed at the cost of the family of Dr. James, who at once generously offered to bear the outlay, both for its removal and re-erection. Originally, a lofty and massive lantern of four stages existed here, and it has been suggested that the fine central tower at Castor, some four miles distant from Peterborough, furnished the type of Abbot de Waterville's design (1155–1177). This tower subsequently proved too heavy for the central piers to support, and in order to prevent the repetition of a similar disaster as had already happened at Ely and at Winchester, the fall of the tower at Peterborough was averted by its being speedily pulled down nearly as far as the crown of the great arches, as we have already mentioned. The existing lantern, having vaulting-shafts of wood in groups of three, has a lierne roof with a central boss representing the Saviour holding the globe. The wooden vaulting was adopted for the same reason which determined the necessity of a light form of stone construction, in order that the mischief already effected by the Norman tower might not be needlessly aggravated. The triforium and clerestory arches adjoining the crossing had already been much crippled by the old settlements, and much ingenuity was displayed by the fourteenth-century builders in the expedients of which they availed themselves for the purposes of lighting their new structure. Two lofty windows on each side are filled with Decorated tracery, and, by deeply recessing the lights on either side, richness and slightness were readily secured. The date given to the erection of this lantern is 1350, though there is some uncertainty as to the exact year. At first, it was surmounted by an octagonal stage in wood, somewhat in the form of a dwarf imitation of the big lantern at Ely. Old pictures show this; and King's etching published in the "Monasticon," and by Browne Willis, giving a "North Prospect of Peterborough," clearly illustrates this structure. It also shows the present central tower proper, as originally built, the tall turrets now existing at the four corners being comparatively recent additions, erected by Dean Kipling at the beginning of the present century to "increase its height and dignity," and these were long known as "the Dean's chimneys." It may be interesting to note that the level of the floor under the tower is barely 28 feet above Ordnance datum, and it is nearly level with the ground-line of the alluvial site on which it stands. Including the modern pinnacles, the tower rises about 150 feet high above the ground, and only some 20 feet higher than the ridge of the nave-roof, and not even the summit of the building can be seen from the sea. The view which we publish to-day illustrates the aspect which Sir Gilbert Scott so much admired, of which his characteristic anecdote respecting two impressionable friends whom he had brought to see the building from this point is apropos. The tale runs that Scott's first friend exclaimed on seeing it, "Oh, how charming! What more could one desire than on this spot to die?" The second, and more prosaic friend replied with some warmth that, "With him quite a contrary feeling was inspired by the sight, which only induced the more firmly his very considerable desire to live."

TOMBS AT CAIRO.

[From the *Builder*.]

PERHAPS the most remarkable structures at Cairo are the tombs of the Caliphs and the Mameluke kings. They are for the most part situated in two large groups outside the walls of the city. There are, however, others, and those probably the earliest in point of date, within the walls of the city; one of the latter is the only existing tomb of what was formerly a large group erected to the memory of the caliphs of the Eiyoobite dynasty. The Caliph Eiyoob, whom this monument records, died in 1250. Why all the others of this group have been destroyed it is difficult to say.

The beautiful tomb which we illustrate is one situated outside the city walls, and forms one of that group called "El Kaitbay" from Kaitbay or Káëdbai, being the most important Sultan of the dynasty which these edifices commemorate. Sir Gardner Wilkinson calls these the tombs of the Circassian Mameluke kings, and informs us that the first Sultan of this dynasty was El Bêrkook, who repulsed the Tartars under Tamerlane in 1393. The largest of these tombs, that to Sultan Kaitbay, dates from the year 1496, and is a rich example of Egyptian Pointed architecture, though from having had a large mosque attached to it, it is less symmetrical than the example which we illustrate, and wanting in the simple dignity and beauty of the latter. Like all Mahomedan buildings, it is quite impossible to judge of the date from its style; it looks, at first sight, to be earlier than the Mosque of Touloon, which is more decidedly Gothic, and has the pointed arch far more strongly developed, yet if the dates

ascribed to these monuments are correct, Touloon is five centuries, at least, earlier! The date given to the Mosque of Touloon, 879, seems almost incredible, even allowing for the stagnation of Mahomedan art, and we should not be in the least surprised if some one were to discover that no portion of the present building was in existence before the year 1100. It used at one time to be supposed that the Temple of Denderah was a work of the time of Rameses the Great, but now we know positively that it could not have been erected before the time of Trajan.

We do not for one moment say that this is also the case with the Mosque of Touloon, because we have no means of ascertaining the facts concerning that building, but we repeat that we should not be surprised at finding that it dates from the twelfth instead of the ninth century. Even if this were the case, it would still be doubtful whether Cairo may not claim to have been the first city in the world where a "Pointed Style" was developed. The whole question is one of considerable interest, and the examples of Mediæval architecture are so remarkable, so singularly beautiful, and offer so many hints for design, especially as regards domical construction and the use of the dome in combination with the pointed arch, that they deserve to be most carefully preserved and protected, and we venture to suggest that the English nation should not let slip the present opportunity of impressing upon the Egyptian authorities the duty of preserving these beautiful monuments. They have in past times been most shamefully neglected; in fact the tombs outside Cairo have served as stone quarries, and nothing has been done to protect them from destruction. It seems strange that the present rulers of the country should have exhibited no respect or reverence for the tombs of their ancestors.

THE UNITED STATES COURT-HOUSE AT FRANKFORT, KY., MR. JAMES G. HILL, ARCHITECT.

PERSPECTIVE DIAGRAMS. — PLATE XXI.

FOUNTAIN OF THE THIRTEEN SPOUTS AT ANCONA, ITALY. [From *Le Moniteur des Architectes.*]

SIDE PORCH OF ST. PHILIBERT, DIJON, FRANCE. [From *L'Encyclopédie d'Architecture.*]

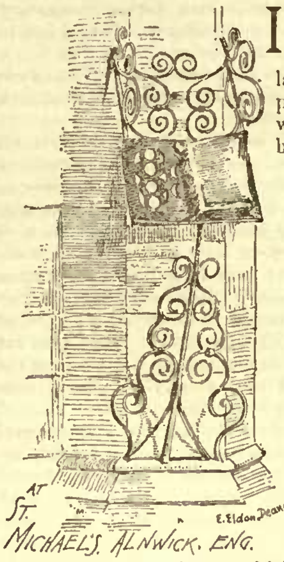
THE EDEN THEATRE, PARIS, MM. KLEIN & DUCLOS, ARCHITECTS. [From *La Semaine des Constructeurs.*]

THE façade of the new theatre is full of movement without having fallen into historical extravagance. The lower story is solid and rather dwarfish. It gives approach to the entrance vestibules, which are lighted just enough for one to see his way clearly, and have no luxuriance of ornament, in order that the effect of the decorations seen from the grand staircase may not be diminished. The first story is pierced in the middle by a group of three windows, and by a pair of coupled windows at each side, which correspond with the arrangement of the *foyer*. The bays beyond this on either side light the staircase. The only color employed on the exterior is furnished by some columns of red Scotch granite, and some borders of Venetian enamel, which serve to break the monotony of the coloring. The only other color is furnished by the stained-glass windows when the theatre is lighted at night.

If the façade is sober, the interior is not. Here everything is brilliant and glittering with light. There is not an inch of wall-space which is not painted, gilded or covered with glass enamel. As in the façade, the motive of decoration has been borrowed from the Orient. The grand staircase ascends from the vestibule right and left, unites, and ascends in a single run to the first landing, then separates, and proceeds in two narrower runs to the *foyer*. This occupies the whole breadth of the building, except the two extreme bays. The decoration of the *foyer* is in tones of brown, and gilding is freely used. The ceiling is divided into three compartments. Three chandeliers light the vast room. From the *foyer* one can see, either directly or by the reflections in mirrors, the entire interior of the edifice. The axis of the auditorium is in the same line with the axis of the *foyer*. These two portions of the edifice are separated by an open corridor. To the right of the auditorium is a large rectangular room which is styled the "Indian gallery," and at the left is a conservatory of the same dimensions. Rows of columns bound together by light and graceful arcades mark the general divisions of the building, leaving everywhere large openings through which the eye wanders at will. The architects have adopted the best methods of construction which would allow them to attain the effect which they desired. The whole structure is of iron, but all the metal-work — columns, vaults, ceilings, etc.,—has been encased with stucco.

The decoration of the auditorium is in more brilliant tones than that of the *foyer*. The ornamentation of the "Indian gallery" is in harmony with that of the stage and the *foyer*. The conservatory is composed of a metallic frame-work independent of the lateral walls, and covered by glass slightly opalescent in tone. The walls of these two rooms are coated with glass which offers an illusion of infinite perspective. The auditorium is octagonal—the proscenium arch occupying one side of the octagon—and will seat about 1,500 persons. The only boxes are a few stage-boxes, and the *baignoires* below the gallery. The corridor is lighted by large lustres, the shades of which are of yellow glass, from which it results that the light corresponds with the general tone of the decoration of that portion of the building. The "Indian gallery" and the conservatory are lighted by Siemens's electric-lights, these introducing a third tone in the illumination employed. The stage is about as deep as that of the New Opéra, and is large enough for 500 or 600 performers. A stable for fifty horses has also been introduced. The cost of this building, which was erected with the most astonishing rapidity, was only about one thousand francs per square metre.

NEW BOOKS.



IT is a very encouraging stage in the progress of the civilization of a country when it is found worth while to formulate its practices in any branch of employment, for the sake of eliminating what is proved by careful examination to be bad, as well as of putting in practicable working form the teachings of experience. Until such a time has come everything is done tentatively, or else the formulas that apply to conditions existing in other countries are employed without reference to their applicability to different conditions. Seemingly, such a time has come when it has been found worth while to examine the constructive sciences as practised in America with a view to preparing text-books which shall, to a degree, take the place of the excellent standard English, German and French text-books which have hitherto been used, but which are always found only one tithe part as useful as they might be, because they deal with materials, methods and conditions which do not obtain here.

The American engineer has long had an acknowledged standing in the scientific world, and his performances are studied and his dicta listened to with as much respect as any one's, and it is only natural that the literature of American engineering should be at once more voluminous and more intrinsically valuable than the literature of American architecture. Comparatively few works on architecture have ever been written or compiled by Americans; the majority of so-called architectural works published here being mere collections of illustrations, whose real object is less to improve the public taste, and still less to afford real aid to members of the profession in their struggle toward higher achievement, than the advertising of the personal prowess of the author, and though the catalogues of some publishers contain a fairly long list of American architectural works, the proportion of grain to chaff is very small. The reason for this condition of things is that until within a few years there have been comparatively few men whose attainments qualified them to undertake any literary work, and these few have been too absorbed in the active exercise of their profession to be able to do so; and more largely because the necessity for such work was not very pressing, thanks to the abundance of good architectural literature produced in the mother country in the past and in the present, where the average attainment of the profession is higher than it is here, and the supply of hands for active professional work is so much larger in proportion to the demand, that many men find it desirable to eke out their income by writing—even if they do not permanently adopt the pen rather than the pencil,—and where the encouragement is the greater in that they are addressing an audience whose acquirements have not been attained in quite the "from hand to mouth" manner in which too many American practitioners are trained.

The most noticeable American book treating of the higher and more abstruse architectural questions is Mr. Eidlitz's "Nature and Functions of Art," but it stands almost the only example of its class. The American mind is practical before it is philosophical, and if Mr. Eidlitz had been a natural instead of a naturalized American his book might have had a less philosophical cast.

The most valuable American books are those which take up the practical questions of the profession, though they are less valuable than they well might be, from being what may be called rather empirical in their treatment, and it is a great advance that now men of thorough scientific training are finding it worth their while to interest themselves in book-making, though most writers of this class are trained in schools of engineering, and consequently approach even those problems in which architects are interested from the engineer's point of view. However, until an entirely satisfactory substitute has been prepared, the American student can use to advantage the admirable "Notes on Building Construction," compiled for the use of those who are to pass the examination of the Science and Art Department at South Kensington.

Certain chapters in Professor Thurston's "Materials of Engineering"[1] will, so far as the subjects of which they treat are concerned, provide such a substitute, more satisfactory and more reliable than can be found in any American book that has yet appeared, and though the book is conceived from the engineer's standpoint, it is of more practical value to the architect than such books are apt to be. The formulas are simple, the language very concise, intelligible and direct, and the arrangement logical. But its chief value lies in the fact that it is American and deals with American materials of the

[1] *The Materials of Engineering.* In three parts. Part I: Non-Metallic Materials: Stone; Timber; Fuels; Lubricants, etc. By Robert H. Thurston, A. M. C. E. New York: John Wiley & Sons, 1883.

well-known merchantable sizes and shapes, called by familiar names, and measured by the accepted standards, so that the student is saved the weary labor of translating into the vernacular, foreign terms and statements based on foreign usages, as he has so long been forced to do when using similar foreign standard text-books. Moreover, its correlation with foreign text-books has been to a degree preserved, as almost all measurements and tables are given with English and metric equivalents.

Of the six chapters contained in the first Part—all that has yet been published—those on fuels, lubricants, and the one on miscellaneous materials (belts, friction, etc.,) do not at all concern the architect, but the others, only one hundred and fifty pages to be sure, treating of Stone and Cement, Timber and the Strength of Timber, are more than ordinarily valuable, in that they are first of all, American, and next, that to a considerable degree they embody the results of Professor Thurston's careful experiments on timber. Besides noting the results of his own experiments the results of other American observers, Hatfield, Lanza, Woodbury, and others are given, often in tabular form, and also statements of the tests made with full-size materials by the great testing machine at the Watertown arsenal, so that we believe we are safe in saying that the book contains, so far as timber is concerned, the latest information brought down as far as the beginning of Professor Lanza's very valuable and practical experiments on full-size timber, which are still going on.

One of the most interesting features of the book is a descriptive and tabulated account of the various processes of preserving timber.

A very excellent example of the other class of American text-books which we have styled above, somewhat too slightingly, perhaps, "empirical," has been prepared by the editor of the *Builder and Woodworker*,[1] who has had the happy thought to gather together the many items of information, disjointed facts, and stray tabular statements that are continually passing under the eye of an editor, and he has been careful to explain that little of the matter is original. This being so, it is rather a pity that he has not given more frequently than he has the sources from which his information has been derived, instead of simply enumerating in his preface those authorities from whom many of his facts are borrowed.

The chief function of the book is to aid a builder in making an estimate, and the tables of materials and labor, which give the cost in approximate figures, with a column in blank at the side, in which actual prices can be noted from time to time, are really valuable, and so far as we know are unique; but they have the disadvantage of being based mainly on New York materials and prices, instead of being extended so as to take in the other sections of the country. This drawback affects also the value of the rules given for the measurement of work. But the book will afford a useful starting-point, and is one which has long been needed; and if any one will take the trouble to interleave the book to give space for his own notes, and rebind it, he will then have as serviceable a hand-book as can be desired. This could be done by omitting the "glossary of architectural terms," which occupies fifty pages about as uselessly as could be accomplished. We should really like to know where Mr. Hodgson found this glossary, for we will do him the justice to believe that he found it "ready-made"; we cannot imagine that any sane person could be so foolish at this day as to prepare for the use of carpenters and builders such a farrago of useless, unusual, and altogether nonsensical terms as have been laid before the purchasers of this book as part of the every-day conversation of architects. No wonder that "practical" men have a quizzical contempt for architects, if they imagine that the latter interlard their instructions with such words as "alipterion," "asarotum," "bursa," "camarosis," "catabasion," "cataconeum," "chartophyacium," "cimeliarch," "laura," "pampre," and a host of similar ones. Can any of our readers give a definition of a single one of these terms without first referring to a dictionary?

A very useful chapter, inasmuch as architects very often are carrying on work in different States at the same time, contains an abridgement of the lien laws now obtaining in the several States.

Probably every carpenter thinks he knows everything about saw-filing, and he can hardly need a very deep knowledge of the higher mathematics to enable him to set his saw for cross-cutting or splitting, but if he could find time to read understandingly Mr. Grimshaw's little treatise on Saw-Filing,[2] he would find that there was infinitely more in the matter than was ever dreamt of in his philosophy. We do not profess to have mastered it, as we prefer to have our saws filed and set in some remote place, that the nerves connected with our front teeth may be saved unnecessary wear and tear; but we can perceive that the matter is intelligently discussed and is certainly amply illustrated.

As we believe few architects are interested in mechanical engineering, we feel that there is little need of saying much more about Mr. Smith's book on Cutting Tools[3] than that it deals scientifically with all varieties, simple and compound, of saws, planes, chisels, files, lathes and drills, and is fully illustrated.

AN OLD CURIOSITY-SHOP. — THE TUILERIES.

Stairway Railing M. G. Davioud. fect par...

THE Tuileries, which has long been an eyesore or a charm to Paris, just as you like to look at it, is at length going to be pulled down. The contract has been signed, the workmen are there pick in hand, and in eight months by the card nothing will remain of these eight centuries of souvenirs of the historic greatness of France. They will all be carted away as rubbish, at least so much of them as the collectors have spared, and the collectors are already very busy. The contractors themselves are going to open an old curiosity-shop in the grounds, and the wealthy amateur is trying to intercept the best things on their way to the shop. He has dug his taster into the solid stone walls for bits of choice ornament, as though it were so much cheese, and he has entered his name on the books for morsels of ruin he is not yet able to reach. The remains of the Tuileries will probably cut up into as many souvenirs as the wreck of the Royal George. There is enough for everybody, and there is variety for the most diverse tastes. You may buy anything, from an entire stone staircase to a bit of broken looking-glass. Yet at a first glance you might think that there was nothing left; the interior seems an utter ruin. The great staircase under its load of débris is simply a hill of rubbish, but the pillars at the sides are intact, and so are the friezes and cornices, most of them perfect specimens of the Louis XVI style. Here the amateur aforesaid has already dug out an ancient helmet carved in low relief, but much remains behind. The columns could be taken away bodily, and they would make a fine rustic temple for garden or park. Mr. Worth has already shown what may be done with such things at his place at Suresnes. Long ago, in the time of the Commune, he bought up what he could find "for an old song," and, with his skill in working up materials, made as pretty a ruin of them as you could wish to see. They say he cries there sometimes over dead fashions, or finds his most solemn inspiration for new ones. It is a *via sacra* that recalls his most distinguished customers. Still for majesty of association he has nothing like the staircase of the Tuileries. At the head of this you come to the Salle des Maréchaux, a most complete wreck. It must have been a perfect barrier on that fateful day. Experts will tell you that there is every sign of fiercest raging fire. Only a stone shell remains; the floors, partitions, cornices, everything once standing between earth and sky, is gone. It is not quite so bad as that in any other part of the building. A few supports in iron-work, so twisted that they seem still to writhe in the flame, show where once the gallery ran. Add to these a little gimcrack shield or two inscribed with the names of great battles, and that is all. These show where the effigies of the marshals were cremated, for each marshal had his shield. The Jena shield is intact, and there is another which once bore the name of Marengo, though it is half burned away. Both of these are already sold. Mere paint sometimes survived where wood and iron, and even marble, were burned away. "*Honneur et Patrie*" is still to be seen over the door in black letters on a gold ground. Beyond this there is nothing, nothing, nothing. It must have been like the fire of five hundred blast-furnaces. There are places where the stone has crumbled to powder in the flames. Oh, the sight for the bird that hovered above on poised wings! The Salle d'Honneur near by is a more orthodox ruin. It is not burned clean out like the other; there are remains. The iron girders nearly gave way; they are bent concave where they were before convex, but still the fire got tired first. All the floor here is a grass-grown slope; the ghosts of courtier shepherds might revisit it to tread a rustic round. The chimney is left, and it is in very good condition. It might be taken away bodily and set up in some country hall; it would hardly do for anything smaller. The flooring beneath it is burned away, and it is perched up by itself in the air in the queerest fashion. In one of the upper rooms there is a little solitary flower-pot hanging in the same semi-miraculous way, between earth and sky.

The exterior offers the richest harvest to the collector. Here, especially in the front facing the Arc de l'Etoile, there is a good deal left: ever so many columns in different styles, and statues, with some balconies in modern iron-work. The fire does not seem to have been overpowering here, and it has left one unique construction in all but perfect preservation — the *perron* or little staircase of the Emperor, by which the imperial family used to reach the garden from the private apartments. This is in iron, and has a double

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[1] *The Builders' Guide and Estimator's Price-Book.* Being a compilation of current prices of lumber, hardware, glass, plumber's supplies, paints, slates, stones, limes, cements, bricks, tin and other building materials; also prices of labor and cost of performing the several kinds of work required in building. Together with the prices of doors, frames, sashes, stairs, mouldings, newels, and other machine-work. To which is appended a large number of building rules, data, and useful memoranda, with a glossary of architectural and building terms. By Fred T. Hodgson, editor of the *Builder and Woodworker*. New York: The Industrial Publication Company, 1882.

[2] *Saw-Filing:* A Practical Treatise in Popular Form. By Robert Grimshaw. With many illustrations. New York: John Wiley & Sons, 1883.

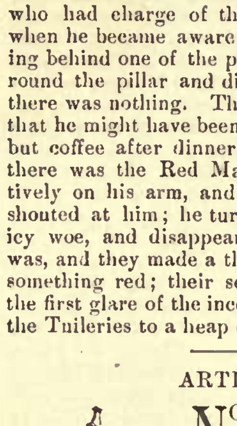
[3] *Cutting Tools worked by Hand and Machine.* With fourteen folding plates and fifty-one wood cuts. By Robert H. Smith, M. I. M. E., Ass. M. I. C. E. Cassell, Petter, Galpin & Co. London, Paris and New York: 1882.

flight, with a gentle curve. It might be taken just as it stands, and with a few repairs it would be as good as new, or, for the collector's purpose, considerably better. This will probably fetch a high price. The minor curiosities, or what one might call the portable ones, are being snapped up day by day. The Louis XVI clock in the Place du Carrousel is gone,—disposed of by private sale. It stopped at a little past nine, so something very decisive in the fire must have happened just then. Even the walls might be sold stone by stone as memorials, and some of these would have a double value, for they are of archæological interest as well.

The building exhibits half a dozen different styles of house construction. An expert will tell you that such and such iron-work or stone is sixteenth-century, and that one bit of wall is twice as old as its adjacent parts. It was very "composite" indeed, and every occupant has left his mark upon it. One ancient style is seen in walls that are merely veneered with stone, and have all the space between them filled with a kind of concrete—the poor, feeble beginnings of jerry-building in the time of Catherine de Medicis. In our day they would have left the concrete out. The way to the upper towers lies across yawning chasms of ruin bridged by planks. The winding stair has been turned by the drift rubbish almost into a winding causeway. The view from the top well repays the trouble of the ascent; you see Paris as you can see it from no other point in the capital—the whole stretch of the Champs Elysées in pure perspective, and the river hard by.

The Tuileries had its ghost, and it was a local, not a family spirit. This is a nice and important difference, and the want of due attention to it has sometimes led to difficulties. A friend of the writer, who had taken chambers in Lincoln's Inn, on the express understanding that they were haunted, was disgusted to find that the ghost disappeared with the late occupant. He was in the nature of personal property, it appears, whereas the new tenant thought that the use of him was included in the purchase of the fixtures—that he was "in the walls," in fact, with other visitants of the midnight hour. The Red Man of the Tuileries, on the contrary, has appeared all through the history of the building, though in the stirring time before the Revolution he was naturally more often on duty. He used to be seen at dead of night, leaning in a sombre fashion, with folded arms, over the staircases, or at one of the great windows overlooking Paris. A few days before the tenth of August, Marie Antoinette's women rushed into her apartment to tell her that they had just seen him in the guard-room, during the absence of the guard. He looked steadfastly at them with a face of unutterable woe. He was last seen during the Commune. The old watchman who had charge of the building was going his rounds one night, when he became aware of a scarlet-clad figure in the gloom, skulking behind one of the pillars. He made for it, but it seemed to pass round the pillar and disappear. He looked about everywhere, but there was nothing. The old man had his own reasons for thinking that he might have been deceived on this occasion, so he took nothing but coffee after dinner next night before making his rounds; yet there was the Red Man again. This time he was leaning meditatively on his arm, and looking down on Paris. The watchman shouted at him; he turned round, faced him with the same look of icy woe, and disappeared. The old man ran for help, late as it was, and they made a thorough search of the place. They did find something red; their search ended in a *sauve qui peut*, as they saw the first glare of the incendiary fire that was to reduce the Palace of the Tuileries to a heap of ruins.—*London Daily News.*

ARTISTIC FIRE-ESCAPES.



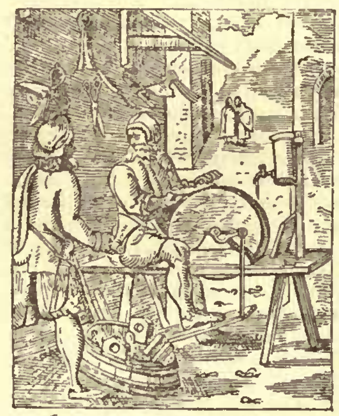
NOW that it is considered necessary to ornament the fronts of all buildings with fire-escapes, it becomes a serious matter to know how this may be done without disfiguring the edifice to which the alleged necessary article is attached. In the first place, it will readily be acknowledged by all who have seen the fire-escapes at present in use that they are anything but ornamental. The spectacle of a building architecturally handsome, but with a landing on the outside at every floor, and a set of black iron ladders connecting the landings, is a sight to make an æsthete or an architect weep. If these exceedingly useful means of escape could only be put out of sight in the rear of the building the case would not be so bad; but it is absolutely necessary that they be on the front of the building. The Inspector says so. Such being the case, the next thing to do is to turn these eyesores into things of beauty and joy forever. We wonder that some enterprising manufacturer has not yet solved this problem. We have been waiting for him to do so; but we can wait no longer, and shall have to tell him how the thing can be done.

Like other great inventions, this is perfectly simple and easy after you have once thought of it. One of the attributes of genius is to put into form that which is already universally nebulous in the minds of the human race generally. That was the way Shakespeare did. Everybody knows the fine things he put into words, but he was the man who first put them into form. That is what we are about to do for the artistic fire-escape. There is no reason in the world why these attachments should not be made as ornamental as they are useful. One form may be called the grape-vine. Instead of running in a hideously parallel and brokenly rectilinear manner down the front of a building, let them meander gracefully all over the front of it, after the manner of a vine. The leaves would serve for steps, and the curling, clinging tendrils for handles to assist one in his descent. The whole thing might be painted green, and a few bunches of purple iron grapes put in here and there would add to the realistic effect.

This form might be varied almost endlessly. Any vine would do as well as the grape, only that has such a sweet suggestiveness when on the front of a hotel! For private houses the ivy might be preferred, or the Virginia creeper, or the mistletoe, or any of those parasitic plants on which poets have expended so much sentiment and ink. Not the least of the excellences of this form of fire-escape would be its educational value. Children in cities, who do not see vines growing in the country, would be taught a useful lesson in botany, and would understand and appreciate much better the poetry to which we have already incidentally alluded.

Of course, the vine is not the only form that could be used. There might be put up an immense full-length figure of Mr. O. Wilde, all hollow, hollow,—head and all,—which could contain a concealed spiral staircase. This would take up more room than the other form we have mentioned, but a niche could be left for it in the middle of the façade, and it would form a very appropriate ornament—we might almost say exponent—for a tall flat. Space fails us to recount the variations which might be made on the plan. It is unnecessary to say more. The scheme is so beautiful, so feasible, and so every way desirable, that it cannot fail to commend itself to the public.—*New York Mail and Express.*

TIMBER-PRESERVING.



A GRINDSTONE OF THE 16TH CENTURY

A FRENCH apparatus for impregnating and preserving timber, one which is most favorable to the application of the chloride of zinc process, has been patented in the United States, with some slight improvement, by H. E. Kreuter. In brief, it is an application of the old Boucherie plan, which has been in vogue for years in Germany, Austria, France and other foreign countries, where, on account of the lack of abundant timber in many sections, or its inaccessibility, except on lines of road, with consequent high expense in obtaining it, methods of treating timber have been favored and employed universally, principally by the railroads. Any antiseptic agent, with one or two exceptions, can be applied by the apparatus, the Boucherie plan being to make a cross-cut in a log to about nine-tenths of its diameter, insert a wedge, and wind a cord or rope in the edge of the cut, on which the log closes on withdrawing the wedge. In this manner a hollow chamber is formed, and a hole being bored on an incline, a pipe is connected and the antiseptic solution forced in toward either end from the centre, penetrating the tubes of the vascular tissue, and driving out the sap, to be replaced by the solution employed. From experience in this method of application, it is asserted that the means is thorough in its results over the whole timber treated, and the fact of treated timber sometimes rotting inside, or at other parts, and remaining partially sound, is accounted for from the fact of imperfect impregnation, the preparation used in some cases obstructing the progress of the antiseptic, instead of equally and entirely distributing it. The logs are regarded sufficiently impregnated when the fluid running from the end contains about three-fourths of the metallic salt employed and no appreciable quantity of sap.

The apparatus employed by the Houston & Texas Central Railroad is different from the one in question. Cars loaded with ties are run on a track leading into a hollow cylinder, where a steam pressure of one hundred and twenty pounds is applied, the sap, steam, etc., finding outlet below, after which an air-pump is applied, and the highest degree of vacuum secured, which, by means of a faucet, draws in heated creosote from another cylinder beneath, the upper reservoir being thus thoroughly filled. A further application is made of about one hundred and fifty pounds pressure, and the timber is left in the cylinder some six hours, when the cars are rolled out. The Kreuter apparatus is much more simple. The French method involved the use of an elevated tank to secure the necessary power for applying the needed pressure, which obviously could not be regulated for different kinds or sizes of timber requiring a varying pressure. In place of the tank a force-pump is employed. Where the timbers are long, the pressure is applied on the end, instead of the centre, a wood cap being affixed thereto so as to form the hollow chamber, the antiseptic being unable to permeate the cap across the grain. The apparatus consists of a portable steam-engine, the pump and a reservoir, and is placed on a flat car, so as to

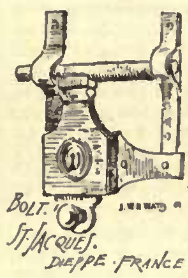
be moved about on railways or tramways. The logs or timber to be impregnated are placed in a yard on a system of framing, on which the distributing pipes are arranged. The boiler of the engine supplies the direct-acting steam-pump, which draws the impregnating fluid by a flexible tube from the mixing tank, forcing it into a wrought-iron cylinder. In addition there is a platform for unloading the logs upon the framing, from whence they are rolled up an incline, to be cut by a circular saw. The machinery required for a portable apparatus, with an average capacity of six hundred ties daily, will cost about $2,500. The apparatus only requires separate yard fixtures and caps to be applied to telegraph-poles, bridge-timbers, or any form of timber. The woods with coarse and straight grain, and abounding in fluid sap, are the more readily and perfectly impregnated, while there are some kinds of wood of which the natural durability is so great — as, for instance, cedar — that a treatment is superfluous; while on the other hand, many kinds of timber, nearly worthless for fuel or building purposes, can be made as durable as any wood, wearing out mechanically and not by rotting. The inventor designs the adoption of the apparatus as an adjunct to saw-mills, where the logs may be treated before being sawed. The cost of impregnating is so slight that the loss of the material employed, in saw-dust, slabs, etc., will be of small consequence, and compensated for by the thorough results secured by treating the whole log, with the bark generally on.

The practical lumberman or railroad man is interested to know the sense and nonsense of such methods. The plan is by many opposed on the ground that they want to sell timber, and the faster it is consumed the better for them; and the better the plan for treatment, the more gingerly are they in taking hold of it. It should, however, be reflected that such means, when found to be successful in their results, will increase the value of timber, and probably the profit in its manufacture and sale, while calling into use certain timber heretofore little employed or entirely ignored, and increasing the manufacturing possibilities, while at the same time admitting of applying the woods in less supply to a more limited scope of service, so as to extend their period of abundance. Gum, hemlock, yellow-pine, and numerous other varieties of timber which are plenty, come into consideration. If the white-pine of the North had competitors more worthy of its steel in the way of general availability, there would be less cause for the howl about its rapid exhaustion, and there are many ways in which treated timber might take its place.

In Austria, Germany and France there are some eighty roads that use treated ties, and thirty-three of them have records of successful processes of treatment. The chloride of zinc method, or burnettizing, takes the preference for several reasons. Its practicability is the best established, the objections to its use are few, and the cost is slight. When applied, it is diluted ninety-nine per cent. Kyanizing, or the use of corrosive sublimate, a poison, is dangerous, the workmen who use it running great risks. Convicts are usually employed for the purpose. Creosoting dates back in its use to ancient Egyptian history. Creosote and cedar oil were employed in embalming mummies, and for general purposes of preservation. The common refined tar used contains one per cent of creosote. When timbers are saturated with this they are highly inflammable, but the process is not particularly dangerous to the workmen. There are, in all, some sixty methods of treating timber, only a few of which have borne out a practical test. Pyroxyline of iron is used by repeated application, by means of a hole in the timber, the agent dissolving itself and becoming diffused through the vascular tissues. Soaking in salt, using a solution of gas-tar, rosin and linseed-oil; charring the surface, to protect the body; steaming with creosote, to prevent dry mould; applying sulphate of iron and sulphate of copper, are processes that have met with more or less satisfactory results. A beech fence has already stood twenty-six years, with sulphate of copper. Where dampness gathered around the spikes or nails driven into the material, a chemical action resulted which induced decomposition. The expedient was adopted of dipping the spikes in tar. There are several solutions employed for petrifying, such as carbonate of lime, alum and potash, steaming with chloride of lime and diluted sulphuric acid, etc., but common or Glauber's salt seems as feasible an agent in this way as any that has been tested. In the German experience creosote costs eight times more than chloride of zinc. There a tie is treated at a cost of six cents, while the Houston & Texas Central Road finds its creosoting process to cost sixty cents per tie. Superheated steam is also held to weaken the wood, by destroying the vascular tissues. By simply dissolving old zinc in acid, chloride of zinc can be made for about two and one-half cents per pound, or it is furnished in tanks at three and one-half cents. The patentee figures the cost of impregnating ties, with the apparatus in proper operation, at about eight cents each. The average life of a tie is found to be about five years, while preserved ties can readily be made to last, as they have in Europe, twenty-five to thirty years.

The Royal Railroad Company, of Hanover, Germany, has sent several specimens of burnettized timber by the patented process, as follows: part of the middle of a pine tie which served on the road from 1852 to 1879; a piece from the centre of a beech tie which laid in the road from 1854 to 1879; a piece from the centre of an oak tie which laid in the road from 1854 to 1879; and other specimens. The testimony is also added that the impregnated timber will wear out mechanically before it will rot. E. Buresch, of the Grand Ducal Railroad, and author of a German work on the subject of timber-preserving, makes some statements of the same character. He tells of pine ties lying in a road from twenty-two to twenty-five years, and when taken out, because of damage to the road, they were undisturbed so far as decomposition was concerned, being made into fence-posts and used in other ways. C. Shaler Smith, city engineer of Omaha, Neb., states that the treatment of wood diminishes its tendency to swell or contract, as observed in timbers put into a bridge at St. Louis, the amount of expansion depending on the wood used. He further says: "I used sweet gum, a wood which rots in four months, and swells one inch and a half in sixteen, as the best wood to experiment with, as it could be had at $10 per thousand. The bridge pavement is nearly two years old, is in first-class condition (the traffic is so great that the average life of a three-inch oak plank was only four months), and out of 1,800 square yards I have had to relay only 260 yards on account of hammocking, and this on the first batch laid; with cedar, oak, pine, ash or elm, there would have been no hammocking at all. It is easily prevented by dipping the blocks in coal-tar after treatment, or laying them diagonally. I laid the bridge-block with one-fourth inch joints. Hereafter I will immerse the blocks in liquid asphalt or creosote, and without any joints at all. — *The Northwestern Lumberman.*

AMERICAN SOCIETY OF CIVIL ENGINEERS.



THE regular meeting of the Society was held Wednesday evening, March 21, Vice-President Wm. H. Paine in the chair, John Bogart, Secretary. The death on March 8 was announced of James O. Morse, one of the earliest members, and who had been Secretary of the Society for fifteen years, and Treasurer twenty-one years. An interesting collection of specimens of native wood was presented by John M. Goodwin, member of the Society. The subject of a continuance of tests of Structural Materials was considered. The Secretary made a statement of what had been done up to the present. Mr. O. Chanute, Chairman of a Committee on this subject, related the effort that had been made to secure larger appropriations from Congress; and the subject of the best method for conducting and continuing tests and of collating results so as to secure desirable information, was discussed. Letters were read from General S. V. Benét, Chief of Ordnance, stating that the programme adopted for continuing tests of Structural Materials would be carried out on the Watertown testing-machine to the extent of the very small amount appropriated by Congress, and the circular from the Chief of Ordnance, embracing that programme, was also read. A resolution was adopted to the effect that it was the sense of the meeting that a Special Committee should be appointed by the Board of Directors, to prepare such a programme and promote tests of structural materials, as to secure the best results possible from the Watertown Arsenal experiments.

CONCRETE BUILDINGS.

MEMPHIS, TENN., March 16, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gents,— Can you direct me to any information in regard to material and construction of cement or shell concrete buildings?

An answer through the correspondence column of your valuable paper would greatly oblige

Respectfully, F. B. HUNTER.

[The following, copied from the Chicago *Times*, answers the question very well.—EDS. AMERICAN ARCHITECT.]

CONCRETE BUILDINGS.—The following instructions have been given for the construction of a concrete house by a person who has recently completed one in the same manner:

1. Select, if possible, a dry situation, and get all heavy materials, such as rock, sand, lime, gravel, etc., on the spot as early in the season as possible, say by the first or middle of May, in order that you may avail yourself of the long, warm days of summer for successfully carrying on your operations.

2. The proper materials are lime, sand, coarse and fine gravel, large and small rock, and water. The lime may be from any good, pure limestone, that will slack readily and "set" or harden thoroughly when dry; the sand should be sharp, and as clear from clay, loam, and other earthy matter as possible, and the gravel and rock may be of any size from that of a boy's marble to eighteen inches or two feet square, according to the thickness of your walls.

3. Having fixed on your plan, lay off the foundation, and dig a trench two feet deep, the area of full size of your cellar wall. With a heavy piece of hard-wood, squared or rounded at the lower end, pound or ram down the earth in the bottom of the trench, going over it repeatedly until it is solid and compact. A layer of hydraulic cement-mortar, two inches thick, spread evenly over the bottom of the trenches thus compacted gives you a solid foundation to start on as soon as it "sets" or becomes hard. If you intend carrying up inside division walls of concrete the foundation for these should be laid in the same way. Good hydraulic cement will take at least three parts of sharp sand, but it must be used as soon as mixed or it will "set" and become useless.

4. Cut common 3" x 4" scantling two feet longer than you wish your highest story to be; set up a double row, with the lower end resting firmly on the edge of the hardened cement in the bottom of the trench; range them true and "plumb" them, letting them stand three or four inches farther apart than you desire your wall to be in thickness; then nail cleats across above and below, to keep them in place, adding also

"stays" or "braces," driven slantingly at the upper end. Your skeleton or framework of scantling being all set up and "stayed" firm and "plumb," proceed to arrange your "boxing" for holding the concrete and keeping the walls in shape. This is done by cutting sound inch or inch-and-a-half plank of ten inches or a foot wide so as to fit inside of the two rows of scantling and form two sides of the box. Moveable pieces the thickness of the wall are dropped in between at intervals, to keep the box of the proper width, and wedges driven in between the boxing and scantling, on the outside, prevent spreading by the pressure of the concrete. Wooden "clamps," to slip down here and there over the upper edges of the boxing, will also be found very serviceable.

5. It will be well to have at least four large mortar beds — one on each side of the house, made of strong planks in the usual way. These should be surrounded by casks of water (oil-casks cut in two are excellent), piles of rocks, sand, gravel, etc., — the lime, of course, to be kept under cover, and used as wanted. Slack up your lime till it forms a thin, smooth, creamy mass; add four or five parts of sharp sand, stirring and mixing constantly, and using water enough to bring the whole, when thoroughly mingled, to the consistency of a thick batter. Into this batter mix coarse and fine gravel (that has previously been screened) until the mass is thick enough to be lifted on a common shovel. (The proper and thorough mixing of the sand with the lime, and the gravel with the mortar afterward, are very important, and should only be intrusted to your most careful hands.) Having one or two "beds" full of this mixture, you are ready to begin your wall. Wheel the mortar to the foundation in common railroad wheelbarrows, letting the common hands shovel it into the bottom of the trenches, while the superintendent or "boss" workman spreads it evenly with his trowel. When the bottom layer of mortar, three inches thick, is laid in, wheel large and small rock (previously sprinkled with water) to the wall, and press it into the soft mortar at every available point, leaving a small space between each piece of rock, and working the soft mortar against the plank boxing, to preserve a smooth surface on the wall. When you can press no more rock into the mortar, pour another layer of the latter over and through the rock, then add a layer of rock, as before, and so on, until your boxing all round is full. You have now ten inches or a foot of wall all round built; and if the lime is good and weather dry it will be hard enough in twenty-four hours to raise your boxes another tier. This is readily done by knocking out the wedges between the plank and the scantling, raising up the plank and sustaining it in place by "cleats" nailed on the scantling. In raising the boxing, begin at the point where you commenced laying up the day previous, as that portion of the wall will, of course, be the hardest. It is not necessary to raise all the boxing at once, or go entirely around the wall in a day. A foot or yard of the wall can be completed at a time, if advisable; but if the complete round can be made, so much the better. Planks to cover up with, in case of a sudden shower or when a storm is apprehended, should be provided and placed within reach.

6. We prefer a cement floor for the basement on many accounts, but those who desire a wooden floor should leave air-holes in the outer wall under the lower floor, six inches above the surface. This may be easily done by inserting wedge-shaped blocks or pins through the wall, to be knocked out afterward. When you are ready to lay the floors, level up your wall and run one course of brick all around the thickness of the wall, for the ends of the flooring joists to rest on, filling-in around these ends with concrete when they are fixed in their proper places. The door and window-frames should be made of three-inch yellow-pine, the thickness or width of the walls, and may be set up and built around, like those in a brick house, as the walls progress. A piece of common inch-plank, "cut in" all around them, to prevent the actual contact of the damp mortar, will keep them, in a great measure, from warping. Where base-boards are needed, blocks of scantling may be built in flush with the inner surface of the wall, at the proper distance apart.

EARTH-CLOSETS.

Los Angeles, Cal., March 9, 1883.

To the Editors of the American Architect: —

Gents,— I would like to know about "earth-closets," for hotels or private houses, how constructed, managed, etc.; whether the results claimed for them have been realized; are they of less cost and superior to the better water-closets, etc.?

Please send me a copy of the *American Architect* which contains a clear exposition of the whole matter, or a pamphlet,

Obliging yours, John H. Cooper.

[Earth-closets cost about as much as water-closets of rather inferior quality. They require a good deal of attention, and are certainly inferior in convenience to good water-closets, but are infinitely superior to the common privy arrangements.

Eassie's "Sanitary Arrangements for Dwellings," or his "Healthy Houses," which is the unabridged form of the same book, will furnish a certain amount of information on the subject; and Col. Waring's book on "House Drainage" contains still more useful suggestions. For the attractive, bright side of the subject, refer to the pamphlet published by the Wakefield Earth-Closet Company, Dey Street, New York.—Eds. American Architect.]

NOTES AND CLIPPINGS.

The Competition for Mechanics' Houses. — We desire to request all competitors who take part in the current competition for "Mechanics' Houses" — the programme for which can be found in our advertising pages — to state on their drawings the locality for which the design is prepared. This simple precaution will do much to prevent the passing of a hasty opinion by the professional or casual reader on the possibility of building such a house for the sum named. We trust that even a larger number of architects will take part in this competition than did in the last; and to encourage those who question the profitableness of spending time upon it, we will say that, judging from the number of letters that reach us from persons who wish to build according to one or another of the designs for $3,000-houses already published, the winners of the prizes are not the only ones who will find pecuniary benefit accruing to themselves through these competitions.

Primeval Maps on Stone.— In many parts of Switzerland are often found smooth, flat stones, evidently hand-polished, and covered with dots, lines, circles and half-circles. The origin and use of these stones, known among country people as *Schalensteine,* has long been a moot point among the learned. Some have thought they were charms, others that were they meant to commemorate the dead, or that the signs on them were undecipherable hieroglyphics; but it has been reserved for Herr Rödiger, of Bellach, in Solothurn, to throw a new light on these mysterious relics of the past and suggest a theory concerning them which seems to meet all the necessities of the case. The *Schalensteine,* he says, are neither more nor less than topographical charts, as a comparison of them with any modern map of the districts in which they are found will show. The engraved dots correspond with existing towns and villages, the lines with roads. Even the fords and mountain passes are indicated. Herr Rödiger has examined many of these stones from various parts of the country, and he possesses a collection, picked up in Solothurn, which form together a map of the entire canton. Another significant circumstance is that the *Schalensteine* are mostly found at intervals of about two hours (say, six miles) from each other, and at spots where several roads meet. The former Herr Rödiger calls "headstones" (*Hauptsteine*), the latter he denominates "by-stones" (*Nebensteine*). If he be right in his hypothesis, the places where these stones are met with possessed considerable populations long before the dawn of history; even the villages shown on the *Schalensteine* must be far older than the Christian era. Herr Rödiger considers the Swiss map stones to be of the same origin as the similar stones which are found in Germany, Scandinavia, India and farther Asia, and sees in them another proof of the high antiquity and common origin of the Indo-Germanic races, and the existence among the latter in an indefinitely remote age of civilized habits, organized trade, and more culture than is generally supposed.— *Correspondence of the London Times.*

Archæological Discoveries in Mexico.— Important archæological discoveries have recently been made at Mitla, a village in Mexico, which is situated between twenty and thirty miles from Oajaca, in the tableland of Mixtecapan. Extensive remains of ancient palaces and tombs have been revealed, and it is stated that they are exceptionally remarkable from the columns supporting the roof, a style of architecture peculiar to the district of Mexico in which they have been found. These ruins have been explored and photographed by Herr Emil Herbruger, although he was not permitted to excavate the sites. In a description of the ruins, Herr Herbruger states that the great hall contains six columns, and is 37 metres long by seven broad. Each column is 3 1-2 metres in height and is of solid stone. The hall, which is entered by three doorways, was used as an antechamber for the royal guards. The tombs are all of equal size and T-shaped. The walls are embellished with stone mosaics. The vault floor is one metre below the surface, and at the entrance stands a monolith column. The tombs extend in order from the column, each being five metres long by one and a half broad; there are also several columns, each two metres high and one and a half in diameter. For some time Herr Herbruger and his Indian attendants used the tombs as sleeping apartments, but subsequently the Indians refused to sleep in the tombs, on the ground that they were haunted. The explorer intends to publish a work descriptive of these discoveries, with photographic illustrations.— *Scientific American.*

Pile-Driving by Dynamite.— In the course of executing some municipal works at Buda-Pesth, the piles already driven were required to stand a greater load than had been originally contemplated. It was, therefore, necessary to test them, and drive still deeper those that yielded. On account of the expense of bringing a pile-driving machine successively over each pile for so little work, it was determined to try the effect of dynamite; and the city engineers applied to Colonel Prodanovic, of the Second Regiment of Austrian Engineers, to carry out the experiments. According to the *Wochenschrift des Oesterreichischen Ingenieur und Architekten Vereins,* the piles were cut square, and a wrought-iron plate, 15 inches in diameter and 4⅘ inches thick was placed on the top of each. On its centre, and immediately over that of the pile, was placed a charge of No. 2 dynamite in the form of a cake, 6 inches in diameter and three-fourths-inch thick, and weighing 17½ ounces avoirdupois. This was wrapped in parchment paper, covered with clay, and fired. The effect produced was found on an average to be equal to five blows from a 14⅘ cwt. monkey falling from a height of 9 feet 10 inches. The iron plates stood from twenty to twenty-four explosions. The system is not considered applicable to a pile standing considerably out of the ground, but saves a great expense when piles already driven have to be sunk deeper. In this country gunpowder has been used for many years, particularly in Philadelphia, for pile-driving, though employed generally to drive the monkey upward. — *Scientific American.*

A Michigan Sanitary Convention. — A Sanitary Convention is to be held at Reed City, Michigan, under the Auspices of the State Board of Health, April 26 and 27 next. Five meetings will be held, opening with an address by the President, Rev. G. L. Beach, and papers are expected on a variety of subjects relating to infectious diseases, ventilation, sewerage, water-supply and the legal side of sanitary efforts with reference to the State and the citizen. The list of Vice-Presidents shows that the gathering is intended to be local.

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WE publish in another place a letter from Mr. Bloor, Secretary of the New York Chapter of the American Institute of Architects, which gives an interesting account of some of the circumstances connected with the bequest of the late Levi H. Willard of New York, to the Metropolitan Museum of Art, for the purpose of forming a collection of objects of architectural art. Most of our readers have probably seen in the daily papers some notice of this bequest, which seems likely to mark an era in the history of architecture in this country. No one, it seems to us, can fail to see that the great need of art here is a supply of good models. Among our young architects and artists are to be found an intelligence, enthusiasm and quickness of perception quite equal to those shown by any in the world, but an art cannot be developed out of enthusiasm alone, and they suffer as much while they are students from the lack of good models to refresh their minds, wearied by universal vulgarity, as they do in after years from the feebleness of the response which the public, accustomed only to bad work, makes to their best efforts. The task of making the collection will not be an easy one, and the profession, even more than the public, should be congratulated that it is likely to be committed to such able hands.

TO the unfailing kindness of the same correspondent we owe a copy of the Senate Bill, number 176, known as the Browning bill, which is now pending before the Legislature of New York, as a substitute for, or rather as an improvement on, the present building law of that State. The New York building law is, so far as we know, the oldest, and also the most detailed and precise, of any in the country, and very many of our readers would be glad to see the text of the draft of the bill presented in full. The order of the sections in the new bill is the same as in the present law, so that it is easy to compare the two. The first innovation of importance proposed is a regulation by which dwelling-houses not over thirty feet in height may be built with exterior walls of brick eight inches in thickness from the level of the first floor to the roof-plate. The present statute considers all buildings less than fifty-five feet in height in a lump, and requires indiscriminately that all walls of less height shall be twelve inches thick. There can be no question that for small, light dwelling-houses eight-inch walls are quite thick enough, and the passage of this provision will lessen the cost of workingmen's houses materially, without taking from them any real security. Party walls, unlike exterior walls, are required in all cases to be twelve inches thick, which, considering the danger that fire may pass from one house to another through an eight-inch wall by means of the beams embedded in it, seems judicious. A similar provision, for allowing the construction of eight-inch brick walls for small houses, has been repeatedly introduced in the Massachusetts Legislature, but has not yet found there the favor which it merits. The new New York law goes on to specify the required thickness of walls of various heights with much more minuteness than the old one, making generally a slight reduction from the excessive dimensions required under the present statute, and exchanging the requirements in regard to walls of buildings more than thirty feet in width, which have hitherto been rarely enforced, for a reasonable and fair regulation.

A MOST important provision contained in the new bill is one requiring all structures more than one hundred feet in height to be made fire-proof throughout; the term "fire-proof" being defined in a subsequent clause to indicate a structure with floors of iron beams and brick arches. After the rules for the thickness of walls comes a set of directions for the proper laying of brick, and composition of mortar, which are excellent in most respects, although the change from the former statute, in requiring cement-mortar to be made of three parts sand to one of cement, instead of two to one, seems to us a doubtful improvement. The best quality of Rosendale cement will unquestionably bear three parts of sand, but with Rosendale of inferior brands, or with Portland cement, even of good quality, such a mixture would, we think, be too slow in hardening to be advantageously used under the trying conditions of New York building. It is singular that the specified proportion of lime to sand for lime-mortar, — three to one — is the same as that for cement-mortar. It is true that a great deal of slightly hydraulic ground-lime is used in New York, which will take less sand than the richer Eastern limes, but it certainly seems unreasonable to suppose that the same proportion can be equally good for both materials. After specifying that all elevator-shafts must be enclosed with fire-proof materials, the bill contains a long clause relating to the construction and arrangement of theatres, which is, so far as it goes, admirable. The only fault to be found with it is that it is not stringent enough, but its framers probably knew just how far public opinion would support them. In regard to the method of enforcement of the law, few changes are made; the most important being a restriction of the power of the head of the Bureau of Buildings to modify the provisions of the statute, which under the present law is general, to the particular cases of alterations of old buildings, use of party-walls, and occasions where there are practical difficulties in the way of carrying out the strict letter of the law; besides an extension of the right of appeal from the decision of the chief inspector. On the whole, the new bill is a decided advance upon the present law, and deserves to pass.

A STORY, very similar to others which have been told before, is related in the *Lancet* in regard to a serious case of typhoid-fever poisoning in England. It seems that at Clapham, a pleasant quarter of London, twenty-one persons were recently attacked, almost simultaneously, with fever, although they lived scattered among sixteen different houses. The houses were all of the better class, and on examination the sanitary condition of all was found to be reasonably good. The only circumstance which seemed to point to a common origin for the different fever cases was that all the persons affected had taken milk furnished from the same dairy. The condition of the farms from which the milk was brought was next investigated, and it was found that the water used for supplying the cows, and also, probably, for washing out the milk-cans, was brought through pipes which leaked in various places, and particularly at a point where they passed near a vault into which the excretions from several typhoid-fever patients had been thrown some months before. The *Lancet* concludes from this that the milk was without doubt the vehicle of infection, and as a case precisely similar occurred a few years ago, it may be presumed that this conclusion is correct. The strangest part of the affair is that the typhoid germs should have retained their vitality for so long a time apparently undiminished; but in view of the proofs found by Pasteur that the ferment of anthrax loses nothing of its virulence after being buried many years in the ground there is perhaps nothing surprising in this. Some time

ago it was asserted, as an illustration of the persistent character of organic contagions, that several laborers employed in making excavations in the place where the victims of the black death in Florence were buried, in the fourteenth century, died with all the symptoms of the same disease; and this may perhaps be less incredible than it appears.

SOME very curious observations have recently been made with the microscope upon the constitution of the air, and it seems likely that this mode of analysis will soon supersede the determination of carbonic acid, which has hitherto served as a rough indication of the purity or impurity of the atmosphere in any given place. M. Miquel, an expert microscopist in Paris, has ascertained the number of organic germs in a cubic metre of air from various parts of that city, and finds that the atmosphere of the park of Montsouris, on the outskirts of the town, contains on an average fifty-one germs to the metre. That of a room in the observatory near the park shows three hundred and twenty-five, and that of the Rue de Rivoli, which runs through the centre of Paris, beside the garden of the Tuileries and other open spaces, six hundred and eighty to the metre. Air taken from a bed-room in the Rue Monge, in the crowded part of the city, gave five thousand two hundred and sixty germs to the metre, and that from a ward in the hospital of La Pitié yielded, in spring, seven thousand seven hundred and thirty, and in winter thirteen thousand two hundred and eighty. In passing from an elevated position to the lower levels of the city the difference is even more striking. At the summit of the Pantheon the average number of atmospheric organisms was twenty-eight to the metre, while in the street below it was found to be four hundred and sixty-two.

THE pleasant anticipations of the community that a law would soon be passed by the Legislature of New York under which the ground about Niagara Falls would be taken for public use, have been chilled by the determination of the Senate Finance Committee to report adversely upon the bill, which has already passed the Assembly by a large majority. This decision is probably made in accordance with the usual and praiseworthy desire of such bodies to lessen the public burdens to the utmost, but there can be no question that the reclamation of the Falls, if not a necessity, approaches very near to one, and as the cost will probably be less now than at any future time there is wisdom in accepting the inevitable at the time when there is most economy in doing so. Some of the daily journals see in the action of the Committee the effect of the influence exercised by the owners of riparian rights, who do not wish to see their mill-privileges sacrificed, but nobody expects to take their property without compensation, and a mill-privilege on the Falls or the Rapids is not so easily brought into serviceable shape that a prudent man need hesitate long about selling it for a reasonable price.

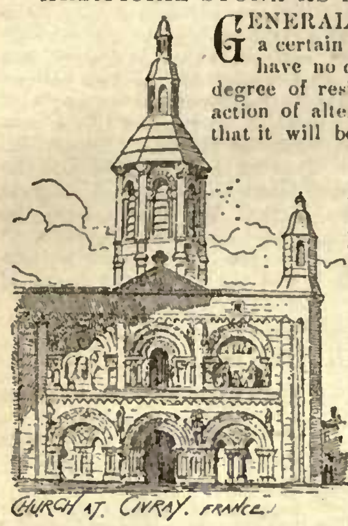
M. GASTON TISSANDIER, who is, perhaps, of all persons living the best authority on the subject, delivered recently before the Conference of the Sorbonne an essay upon the "problem of directing balloons," which is of great interest. The paper seems to have been suggested by the approach of the one hundredth anniversary of the invention of the balloon, which is to be celebrated on the fifth of June in the present year; that being the day on which, a hundred years ago, the first balloon, filled with heated air, was sent up by the brothers Montgolfier from their home at Annonay. The idea of directing the course of such bodies in the air seems to have occurred immediately after their invention, and many devices were suggested for accomplishing this result, the most curious, perhaps, being one which proposed to employ large bellows, placed in the car, and so directed that the blast from them would strike against sails which were also attached to the balloon. Another travelling balloon was to be constructed like an elongated squirrel-cage, large enough to carry five thousand passengers, all of whom would be obliged to climb continually up the sides of the revolving mass, and thereby impel a vast helix, fixed to the outside of the balloon, which could thus be driven through the air; and a third was proposed, to be armed with magnets, which would draw it always toward the north pole.

THESE, and similar inventions, having in some instances proved fatal to their over-confident authors, seem to have brought the subject of aerial navigation into disrepute, and no advance in the art was apparently made until 1851, when a poor, but talented young engineer patented a design for a balloon capable of being turned or directed at will through the atmosphere. This engineer was the celebrated Henri Giffard, who lost no time in reducing his theories to practice. With two of his friends, MM. David and Sciama, engineers of the Ecole Centrale, he constructed a balloon of an elongated ellipsoidal shape, one hundred and forty-three feet in length, and thirty-nine feet in diameter at the largest part, sustaining a long wooden beam, to one end of which was attached a sail, moving laterally as required, and serving both as keel and rudder. From the beam was hung a small basket, containing a steam-engine, constructed by Giffard for the purpose, and weighing, with its boiler, and coal and water for starting, only five hundred pounds. This engine operated a light screw-propeller, fixed to the end of the basket. As Giffard was poor, he was obliged, to obtain funds for his work, to make of his first trial a public spectacle, and he ascended from the Hippodrome in Paris on the twenty-fourth of September, 1852. The balloon was filled only with ordinary illuminating gas, but it took the aeronaut, with the engine and boiler, and about four hundred pounds of provision of fuel and water, easily into the air. The wind was very strong, and the little screw, only about ten feet in diameter, was powerless to drive the huge bulk of the balloon against it, but with one hundred and two revolutions to the minute it was easy to steer at a considerable angle with the direction of the wind, to describe arcs of circles, and even to make head in opposition to it for a moment at a time. After sailing in this way for some hours, at an elevation of a mile, the aeronaut descended safely in Normandy. Three years after this another ascension was made with a similar, but somewhat larger balloon; and although the violence of the wind again prevented the entire success of the experiment, the action of the propeller and the rudder, this time somewhat improved, was as perfect as before. For twelve years after this, Giffard's attention was absorbed in the invention and manufacture of the boiler injector by which he made his great fortune, and it was not until 1867 that he appeared again as the constructor of the great captive balloon at the Exposition of 1867. Returning later to his first invention, he determined to repeat his experiments of 1852 and 1855 on a much larger scale. and deposited in bank a million francs, to be drawn upon for carrying his new plans into execution. In the very midst of his labors he was attacked by an illness which left him almost totally blind; and the task which he was forced to abandon has not yet been taken up by any one else.

A VERY liberal offer has been made to young artists by the proprietors of *Harper's Weekly*, who propose to reward the author of the best original drawing to illustrate a Christmas hymn by Alfred Domett, published nearly fifty years ago, with a prize of three thousand dollars, to be spent in studying art at home and abroad. The competition is limited to American artists under twenty-five years of age, and of course no drawing is to be received which is not the exclusive work of the person offering it. The publishers of the *Weekly* will send a printed copy of the poem to be illustrated to any one who desires it, and all drawings must be submitted on or before August 1, 1883. The announcement of the name of the successful competitor will be made simultaneously with the publication of his drawing, in December, 1883. Three well-known artists, Messrs. R. Swain Gifford, F. D. Millet, and Charles Parsons, will act as judges, and there can be no doubt that the trial will excite great and wide-spread interest.

AN ingenious flushing-tank has been placed upon the market by Messrs. Doulton of Lambeth, which is likely, judging from the frequent inquiries made, to find favor in this country. The principle of the apparatus is much like that of Field's Annular Siphon flush-tank, the flush being obtained by means of an annular siphon, brought into action by the opening of a valve at the bottom, instead of by the filling of the small weir of the Field siphon. The opening of the valve is effected by the elasticity of the air in the siphon, gradually compressed by the rising of the water in the outer bell. A variation on the simple flushing-tank is made by covering the outer siphon, or bell, with a larger bell, the edge of which dips below the surface of the water. This prevents grease from entering the siphon, and the apparatus serves both as grease-trap and flush-tank, while the choking of the siphon is prevented.

ARTIFICIAL STONE AS A BUILDING MATERIAL.



GENERAL Gillmore, in a recent report upon a certain form of artificial stone, says: "I have no doubt that it is capable in a high degree of resisting the effects of heat, and the action of alternate freezing and thawing, and that it will be durable in the latitudes of the United States and the Canadas."

It has long been freely admitted that very simple concretes have great endurance in the tropical countries, but it is now demonstrated that they may be so tempered as to be equally reliable in the temperate zone. I do not intend to claim for either of the several methods a preference over others, but simply to assert their generic title to a respectful and attentive consideration. The high antiquity of similar products is beyond dispute, and the high authority of modern scientists is strongly upon the side of those who are claiming for recent developments the attention due to the revival of a "lost art." The word *adobe* is perhaps the oldest word in general use to preserve its signification throughout all ages and all climes. Derived from the Egyptian word *adoub*, still used by the Copts, carried by the Moors to Spain, thence to America, thence to the Sandwich Islands, and now to China, it may be said to have made the circuit of the globe. Everywhere it expresses the same thing and bespeaks the natural tendency of man to look about him for a cheap, durable and sufficient building material, which has evinced itself ever since Cain went out from his father's house and "builded a city."

Rude samples of artificial stone have come down to us from the earliest annals — even from pre-historic times. It seems, therefore, a very little thing to so improve upon these as merely to give them symmetrical and ornate form. This is chiefly what the present movement claims or can claim. What a simple proposition it seems to be! And yet it is one that modern engineers and architects have been very slow to entertain. Even in this field, however, Nature has been before us. We find her wonderful creations — symmetrical, multiform and ornate — in the hidden caves and grottoes of the earth, where percolation quietly reveals her stilly processes,— in the "wonderlands" of New Zealand or in our more wonderful recesses of Wyoming, — in the basaltic rocks of Ireland, or in the fastnesses of our Rocky Mountains. She has thus demonstrated not only how rocks and quarries have been created, but that stone may be fashioned into ornate or fantastic shapes in the very process of formation. How pointedly we are invited therefore to this field! Ruskin in his "Stones of Venice" beautifully remarks, "all noble ornamentation is the expression of man's delight in God's work." Indeed every worthy effort of Art is in some way an imitative tribute to some work of the Great Architect.

The artificial production of stone is simply the attempt upon the part of man to effect by rapid manipulation what Nature is constantly doing by slower and imperfect means. If plants may be improved by culture, if fruits may be made more luscious, if animals may be brought into subjection, nay, if man himself may be transformed from a rude, uncultivated child of the forest to a capable, industrious, intelligent citizen, why may we not also expect to improve upon Nature in the simple production of stone? If we discover her throwing certain elements, in shapeless masses, into the recesses of the earth, to be excavated only by herculean effort, and shaped into form by patient and laborious skill, why may we not take these same elements, in their plastic condition, and mould them into whatever form the arts require? The same order of intelligence which prompts us to improve upon Nature in other directions leads us intuitively to this.

Within the last fifty years much attention has been directed to this subject, but more particularly within the last decade. Forty-five years ago there was erected on the north shore of Staten Island, in New York Harbor, a stately, battlemented mansion, formed exclusively of artificial stone, familiarly known as "the cement house," every block of which was moulded on the spot. Although a mere stripling at the time, I became deeply interested in the work, and a few months ago visited the spot and found the building not only in perfect preservation, but was told that a master workman, who was recently called to make some alterations upon it, was of the opinion that if it should ever be demolished it could only be done with dynamite! Its position is upon a high bluff, of great exposure and bleakness, the north winds sweeping with unbroken force upon it from over the Newark meadows and the bay of New York for several miles. The walls are very thick and constantly hardening with age. As a test of endurance in this climate, no one need ask for anything more conclusive.

But a more interesting, because a more expensive and an entirely monolithic building,[1] has of late years been erected at Port Chester, N. Y., upon an eminence overlooking the boundary line between the States of Connecticut and New York. This is the palatial residence of Wm. E. Ward, Esq. It is built entirely of artificial stone — the foundation and the roof inclusive — towers, colonnades, floors, staircases, balustrades, balconies, porches and all. Its construction occupied five years, its cost $100,000, and it has been occupied by the family of its enterprising proprietor since 1876. Its strength may be imagined when we state that when the parlor floor, with a span of eighteen feet, had been laid one year, a weight of twenty-six tons was piled in the middle of it and left there through the winter, the apparatus arranged for determining the deflection showing only one hundredth of an inch depression. Here is another instance of an elegant private residence standing upon an eminence of unusual exposure, swept by the direct north-easterly gales of Long Island Sound, and thoroughly weather-proof and fire-proof. An exhaustive description of this building, and of *béton* construction generally, is to be read before the American Society of Mechanical Engineers, at their meeting, to which I respectfully refer your professional readers, quite confident that it will amply repay them.

[1] For a full description of this building see the *American Architect* for August 17, 1877.

Another interesting building, an immense warehouse, six stories in height, and covering an entire square, 360′ x 400′, has recently been erected at Chicago, by the well-known firm of J. V. Farwell & Co. The first story of this building is entirely of artificial stone, moulded on the spot, and laid up in the usual manner. The stone is dressed and finished with chamfered edges, and has not cost one-fourth the price of limestone or sandstone. I have had the opportunity of examining this work quite recently, and find that it has stood the severe tests of the past winter without a check or blemish of any kind. The same may also be said of a monolithic retaining-wall erected last summer at Fort Snelling, Minn., where a structure of natural stone had proved inadequate, and had to be taken down.

I could extend this article by further instances of the kind, but must be content to simply mention some of the most noteworthy—a section thirty-seven miles in length, of the Vanne Aqueduct of Paris—an entire Gothic church, with its foundations, walls and steeple, at Vesinet, near Paris, the municipal barracks of Notre Dame, the jetties at the entrance of the Suez Canal and at the mouth of the Mississippi River, the great mole of Cherbourg, the Port Saïd breakwater and light-house, the harbor works of Alexandria and Marseilles, the Mont Cenis tunnel, etc. And if I should venture upon the inviting fields of historic and pre-historic evidence I should transcend by far the limits to which I have promised to confine myself. As has been said by a high authority, "there is scarcely any limit to the application of this material for building purposes, nor any place where natural stone is now employed where it may not be substituted with advantage and economy." H.

BUILDERS' SCAFFOLDING. — X.

IN considering the force of the action of waves or water currents on the standards or columns of staging, false-works of jetties, etc., alluded to in the January, 1883, paper, it is desirable to have some data of the extreme mechanical effect of sea-coast waves impinging against a vertical plane surface perpendicular to the direction of the waves' motion. The force of sea waves depends on their height, which in turn depends on their "fetch," or distance of their origin, and on the depth of water, as well, of course, as the actuating causes. Thomas Stevenson gives the result of experimental observations made on the west coast of Ireland, of which the following is an extract: —

		Summer	Winter	
Force in lbs. per sq. foot, perpendicular	611,	2086,	6083	In storms.
Depth of water in ft., where observation made	9.8,	average 33,	average 97	

Bracing should not be affixed to standards of iron, where permanently under water, because of the rapid corrosion of joints and the impossibility of necessary occasional inspection, repairs, and re-adjustment; indeed, iron is entirely unfitted for such a position, as it would ordinarily corrode in a very short time and greatly reduce its initial strength, and cast-iron is further peculiarly debarred from use in such a situation by its inability to resist the impact of violent wave-shocks: wood suitably selected has advantages in these respects over iron.

As it is inopportune at the present stage to consider the subject of bending moments on columns, etc., we may, in the meantime, make a few observations tending to show that an intelligent application of most of the formulæ is essential to their safe employment in the varying circumstances which are inseparable from practice, and consequently that a thorough understanding of the theoretical conditions or assumptions on which formulæ are based is of vital consequence; thus, for instance, with regard to the common theory of *bending* it may be mentioned that it assumes that the material is so homogeneous throughout every particle of its composition, and in the cohesion between contiguous individual particles, that every imaginable transverse section through the structure, and which is conceived to be

perfectly flat previous to the creation of this bending stress, *remains* mathematically flat when that stress is applied, and hence when the conditions in practice do not correspond with, or in many cases do not even approach to, those assumed in theory, there must be a corresponding departure of the practical from the exact theoretical results.

Again it is assumed that the modulus of elasticity is the same for all degrees of stress, both in compression and tension, but this is not exactly realized in practice.

It may also be observed that there is a vicious popular misapprehension with regard to the theory of the factor of safety, which in many instances lends itself to the enforcing of designs of structures, which imperfectly correspond with the theoretically assumed units of strength of perfect specimens of materials which are tested under more favorable conditions than are usual in practical strains; assuming that a compound structure liable to so many undetected present and prospective accidental weaknesses, both in material and workmanship, is in all particulars equal throughout in strength to such unit measure.

It is self-evident that none of these assumptions are completely realized in practice, and hence the necessity of realizing these departures, in their absolute mechanical values in practical results, and of the ability to apply the necessary corrections in the elements of the design to the extent of their realization in any given case. It is this ability which exercises the really practical skill of the engineer, architect and contractor. Many of the elementary text-books are at fault in not sufficiently recognizing or denoting these several discrepancies in the practical application of mathematical formulæ. It is much to be feared that in the designs of many bridge and other structures which have conspicuously failed, these facts have not been sufficiently appreciated.

Assuming that an arrangement of bracing, as for instance that in a composite standard or "cage," on which the Scotch swing-derrick-crane is usually mounted to the requisite height to command the prospective building, or the *sapine* of the French scaffolding previously described, or the hoist-cage guide used sometimes for raising the materials for building church-towers, etc., to be such that the number of its parts is only sufficient to keep it in its normal shape when distorting forces are applied, it would then be non-redundant, as previously explained, in which condition the stresses are readily found directly. Thus for each diagonal brace or *link* it would be merely equivalent to the whole horizontal wind-force pressing on that portion of the structure which lies *above* such diagonal, divided by the sine (see Appendix) of the angle of inclination of the diagonal to the vertical, *i. e.*:

[1] $\frac{\text{Wind-force above diagonal}}{\text{Sine of angle of its inclination}} = \text{pull or push exerted through base.}$

For each horizontal bar, the wind-force would be taken the same as for the diagonal, but in this case the divisor would be unity, because the angle is 90°, the sine of which is equal to radius = 1. The *length* of an oblique brace is $= \frac{\text{Distance between standards}}{\text{Cosine of angle with the vertical}}$.

An angle of 45° would be the most economical so far as the mere brace is concerned, but it would necessitate a greater number of them in a given height in such a structure, with a corresponding increased reduplication of the horizontal bars. The greater the angle that the brace makes with the vertical, the wider apart must be the columns or standards of a skeleton pier, etc., for the same vertical height, requiring a larger cross-section to resist the bending moment of the same compressive strain; but, on the other hand, the less is the stress on the greater angle-brace which the same intensity of horizontal strain produces. There is the greater need of care the wider apart the standards so braced, and the larger the proportions of the structure.

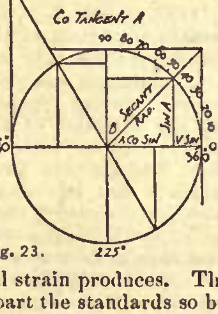


Fig. 23.

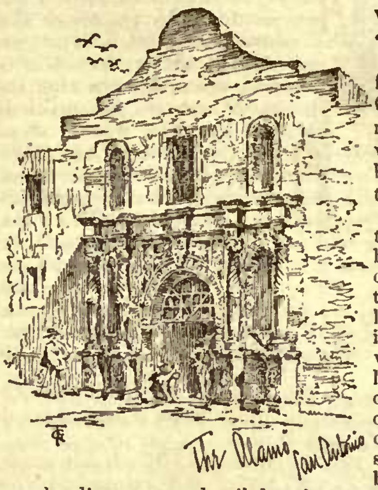
APPENDIX.

In order that the reader unacquainted with trigonometry may not be deterred from perusing this paper or the previous one, by the appearance of trigonometrical notation symbols, we may in the meantime, before formally considering the notation, etc., merely explain the normal position of the functional lines (which represent ratios, as explained in the foot-note) here used by means of the diagram, Figure 23. It will be observed that the circle is divided by two diametrical lines perpendicular to each other into four equal arcs called quadrants, each of which represents an angle at the centre of the circle, *i. e.*, at the intersection of the two diameters (and lying between any two adjacent radii) of a right angle = 90°; the whole circle containing 90° × 4 = 360°, each of which is divided into 60 minutes, and subdivided into 60 seconds. Of the two oblique radial lines, the one to the right is the *secant* of an angle of 45° A, from centre of circle to point of intersection of the perpendicular drawn from right extremity of radius. This perpendicular is the *tangent* of angle A. That to the left is similarly the *secant* of an angle of 60°. It is here drawn on left side of diagram to avoid confusion of lines. The vertical line drawn from the intersection of the secant with right-hand quadrant of circle, to the radius, is the sine of its opposite angle, A, and the portion of the radius between centre of circle and the sine is the cosine of angle A.[2]

[1] The reader unacquainted with trigonometry need not be repelled by the symbols sine, cosine, tangent, secant, etc., as he can nevertheless use them to advantage, because all that they indicate here are functions of the angle of inclination of the diagonal, etc., which are convenient decimal ratios which the several sides of any right-angled triangle bear to one side, which is known, and is assumed as *radius* = 1, in order to facilitate arithmetical calculations involved in the solution of such problems. He has only to refer to a table of *natural* sines, cosines, etc., in any of the numerous engineering hand-books, and find the required angle: when it is less than 45°, the symbol or heading is at *top* of page; but if above 45°, the symbol is at *foot* of page, and the columns are read upwards in the latter case; thus, if the above angle were 30°, the sine value is found under heading at top of page to be .500, *i. e.* = a half of radius. In the last paper we used the ratio 1.4142 to find the length of the diagonal of a square whose side is unity = 1. Now we will find in the same *natural* tables that this is the *secant* of an angle of 45°, and therefore forms the hypothenuse of a right-angled triangle, whose base and vertical are each = 1; *i. e.*, the half of a square; the trigonometric representative of the base in this case being the *radius*, and of the vertical being the *tangent*. If hypothenuse be assumed as radius, the other two sides become the sines of *their* opposite angles.

[2] The foregoing, in connection with the foot-note above referred to, will probably suffice for the present.

MACHINE-SHOP FLOORS.



THE following extracts from the specification for a Crane Shop to be built for the Yale Manufacturing Company at Stamford, Conn., may be of service to those who may have to build similar buildings for heavy manufacturing purposes.

Floors. — That the whole interior of the Crane Shop shall be floored in the manner indicated on the detail drawings; that preparatory to this all soil or loam shall be removed from the interior of the building, and its whole surface graded to a proper level with clean gravel, stone or ashes, which shall be rolled or otherwise packed until thoroughly hard and solid; that a series of 2½ x 4 inch stakes shall be driven into this gravel in regular lines as per detail drawing, each stake to be driven down to a solid bed, or not less than 30 inches, and that nailing strips, fitted and well nailed to these stakes, shall then be laid and carefully levelled to the proper height so as to insure the proper support and perfect levelling of the whole floor; that on top of the gravel bed, and between and under these nailing strips, there shall be laid a course of concrete not less than 8 inches thick, consisting of clean cobbles averaging about 2 inches in diameter, well coated with coal-tar or bitumen, and laid in place while the latter is soft and then solidified and packed together by being rolled and tamped, the upper surface of the concrete course to consist of a thin covering of tarred sand or fine gravel, filling the interstices of the cobbles and thus forming a smooth, hard surface, flush with the top of the nailing strips; that on the top of this shall be laid the first course of wood, consisting of two-inch plank, not exceeding 7 inches in width, tongued and grooved together, or grooved on both edges and fitted with hard-pine splines measuring ⅝ x 1½ inches, these planks to be mill-worked to uniform thickness, and laid with the surfaced side up, each plank to be fastened with two forty-penny nails at each intersection with the nailing strips and all butts to be made on a nailing strip; that on the top of this floor the Contractor shall lay a course of building paper (the paper to be furnished by the Company) and over this a course of yellow or hard pine flooring, 1¼ inches thick, the strips not to exceed four inches in width, and to have standing or straight edges (without tongue and groove) and to be mill-worked to uniform thickness, the surfaced side laid up, each strip to be fastened to the under floor, by two ten-penny finishing nails in each 16 inches of length, these nails to be well set, so as to stand at least one-quarter inch below surface of floor, the floor to be carefully fitted and well secured around all piers, and against all walls. Openings to be left in this floor around foundations for heavy machines as the Company may direct, an abatement of 20 cents per square foot to be allowed by the Contractor to the Company for the floor-surface thus exempted from covering. Two car tracks to be laid, one lengthwise of the building and the other transversely, each to extend from wall to wall; the timber for these tracks to be the size shown by the drawing, and laid as therein indicated, this to be done prior to laying the concrete, which latter shall be carefully laid and rammed around, between and under the timbering for tracks the same as elsewhere, the Company to furnish the rails and spikes for the tracks, and the Contractor to lay and fasten the same in place, commencing at the door-sills and completing the tracks within the building, excepting the turn-table at their intersection, which latter shall be furnished and set in place by the Company.

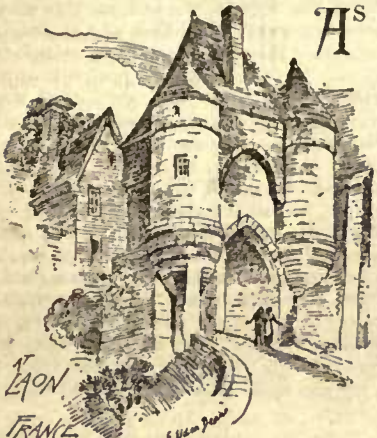
That the floor of wash-room in Crane Shop shall be built as per detail drawing, the under side of floor and timbers to be finished in the same manner as specified for the interior of roof; that the floor proper shall consist of two-inch spruce plank laid on the timbers, and above this a floor of one and one-quarter-inch hard-pine, with building paper between, the width of floor-plank, mode of nailing, finish, etc., all to correspond with the specification for the main floor of the building; that the Contractor's work on wash-room shall terminate with the floor and stairs leading thereto, including the band-rail around the same, and that the company will do all further fitting up of wash-room.

That the floor of Smith Shop shall be made as follows: All soil or loam to be removed from the building and the whole surface to be then levelled up to the proper height with clean gravel, sand or ashes, well

rammed and packed where necessary; that on top of this shall be laid a course, not less than six inches thick, of sand and clay well mixed together with water, in such manner and proportions as to properly harden, and then spread in place and there puddled, tamped and rolled to the proper grade and perfectly level, so as to form a smooth hard clay floor over the entire building; that prior to laying this floor the Contractor shall lay the timbering for carrying the track transversely across the Smith Shop, as per drawings, and lay the rails which shall be furnished by the company. That the space between these tracks, and also a width of twelve inches outside of each rail, shall be covered with four-inch spruce plank well spiked to the cross-ties and laid so that the upper surface is flush with the top of rails, the clay floor to stop against this plank on each side of the track.

THE $3,000-HOUSE COMPETITION. — VIII.

DESIGN SUBMITTED BY "*Bboul.*"



AS a prefatory remark, it is but just to say that although this house *could* be built in certain localities for $3,000, still, to a man answering the conditions of the problem, the situation would be of great importance, and therefore "*Bboul*" thinks it advisable to place the unfortunate man either in Brookline, Longwood, or Jamaica Plain, rather than in any of the towns north of Boston, where undoubtedly estimates would be from twenty to thirty per cent less.

OUTLINE SPECIFICATIONS.

Foundation Walls:—18-inch rubble to grade; 8-inch brick wall to sill.

Scantlings: — Sill, 6″ x 6″; outside studs, 2″ x 4″; inside studs, 3″ x 4″; joists, 2″ x 9″ and 2″ x 8″, and 2″ x 7″ respectively, for first, second and third floors; rafters, 2″ x 6″.

Boarding: — (Rough) hemlock.

Plastering: — Two-coat work; no back plastering.

Balloon Frame.

Windows: — Ready-made sizes.

Doors: — Factory-make, 1½″ thick.

Shingles to be perfectly plain, neither stained nor painted.

Clapboarding: — Below second-floor joists, to be painted.

Felting-Paper between rough boarding and clapboards and finished flooring.

Chimneys: — 4-inch walls; 8″ x 8″ flues.

Plumbing: — Tub, water-closet and bowl in Bath-room; sink in Kitchen; hopper in basement, and two set tubs.

Cellar concreted.

Trunk-room in attic, unfinished.

ESTIMATE OF QUANTITIES AND PRICES RULING NEAR BOSTON, MASS.

Item	Rate	Amount
200 cubic yards excavation,	@ $ 0.25 per yd.	$ 50.00
50 perch stone,	" 3.75 " perch	187.50
9000 brick,	" 20.00 " M.	180.00
655 sq. yds. lath and plastering,	" 0.20 " yd.	131.00
15000 " ft. of lumber and rough flooring,	" 17.00 " M.	255.00
1750 " " upper-boarding,	" 25.00 " "	43.75
23 windows, including fixtures,	" 5.00 " wind.	115.00
23 doors " "	" 6.50 " door	149.50
18500 shingles,	" 4.75 " M.	87.87
1500 clapboards,	" 28.00 " "	42.00
Plumbing		200.00
Painting		125.00
Stairs		125.00
Furnace		150.00
Labor		500.00
70 feet gutters,	" $0.12 per ft.	8.40
50 " conductors,	" 0.10 " "	5.00
8 kegs nails,	" 4.00 " keg	32.00
Hardware-fixtures		10.00
Fireplaces, including mantels (two)		50.00
		$2,547.02
Contractor's profit, say 10 per cent	$254.00	
Architect's commission, 5 "	125.00	
Leaving for extras,	74.00	
		453.00
		$3,000.02

N. B. By a little closer figuring the estimate might *possibly* be brought down to $3,000.

DESIGN SUBMITTED BY "*Spring Chicken.*"

Excavation and Masonry: — The Cellar to be excavated 6 feet below grade line. A cesspool 100 feet from house. The foundation-walls to be of good local stone, laid on flat beds; face pointed above ground and inside dashed up. Piers of porch and chimney, of stone.

Brickwork: — Brickwork of good sound brick, run of kiln. Chimney topped-out with dark stretchers, with black mortar. Fireplaces in Hall and Dining-room of pressed-brick.

Carpenter-Work. — A balloon frame sheathed with 1-inch hemlock; a layer of paper-felt next the sheathing, and the whole covered with California red-wood shingles. All lumber for frame, joists, etc., to be of hemlock. All mill-work and joinery, exterior and interior, to be of good white-pine, for painting. All flooring and stair-steps to be of yellow-pine. Hardware plain and substantial.

Plastering: — The whole interior to be plastered with good two-coat work.

Tinning:—Valleys, gutters and conductors of best IC charcoal tin.

Painting: — All interior wood-work, and all exterior except shingles, to be painted with three coats of best white-lead linseed-oil paint. The shingles to be coated with crude petroleum.

Plumbing: — A drive-well 20 feet deep under Kitchen, with an iron force-pump supplying, by a ¾-inch lead pipe, a 500-gallon round cedar tank in the third story. From tank ¾-inch supply to be carried to bath-tub, water-closet, boiler and sink. A ½-inch supply hot water to bath and sink, with the requisite fittings and traps, all to drain into a 4-inch iron soil-pipe, run out at roof, and connected outside with terra-cotta drain to cesspool.

Heating, etc.: — A good portable heater in Cellar, with requisite tin flues to distribute heat as indicated to first and second stories. A small, single-oven range in Kitchen, with water-back, etc.

ESTIMATE OF QUANTITIES AND PRICES RULING NEAR PHILADELPHIA.

MASONRY, EXCAVATION, ETC.

Item	Rate	Amount	Total
540 cub. yds. excavation,	@ $ .23 cts. per yd.,	$124.20	
50 ft. terra-cotta drain-pipe,	" .30 " ft.,	15.00	
67 perches stone-work,	" 2.75 " perch,	184.25	
			$323.45

BRICKWORK.

Item	Rate	Amount	Total
13500 bricks,	@ 8.00 per M.,	$108.00	
Laying same,	" 4.00 "	54.00	
500 pressed-brick,	" 20.00 "	10.00	
Laying same, (two fireplaces)		10.00	
35 ft. terra-cotta pipe in chimney, and 3 sleeves,	" .20 per ft.	7.60	
			189.60

CARPENTER-WORK, LUMBER, AND HARDWARE.

Item	Rate	Sub-amount	Amount	Total
2500 ft. hemlock joists,	@ 14.50 per M.,		$ 36.25	
4500 " studs and rafters,	" " "		65.25	
3500 " boards,	" 15.00 "		52.50	
2250 ft. yellow-pine flooring,	" 27.00 "		60.75	
13250 shingles,	" 14.00 "		185.50	
40 squares rosin-sized roofing-felt,	" .40 per square,		16.00	
4 cellar window f'm's with glazed sash,	" 1.50 " window,		6.00	
12 window frames with glazed sash,	" 3.50 " "		42.00	
12 " " " "	" 3.00 " "		36.00	
10 pairs outside shutters,	" 2.00 " "		20.00	
3 " inside "	" " " "		6.00	
500 ft. cornice moulding,	" .06 " ft.		30.00	
350 " bracket, porch-posts and plates, barge-boards, etc.,	" .05 "		17.50	
Front door and frame			3.75	
Vestibule door			2.40	
Kitchen door and frame			3.75	
19 interior doors,	@ 1.60 per door		30.40	
Door casings			10.00	
" trimming			33.00	
200 ft. window trimming,	@ .05 per ft.		10.00	
18 pairs jap. iron butts,	" .20 " pair		3.60	
3 " " "	" .25 "		.75	
10 jap. iron locks with knobs,	" .30 each,		3.00	
4 " " "	" .20 "		.80	
4 mortise " "	" .75 "		3.00	
1 front-door lock, complete			2.00	
1 rim lock			.35	
1 doz. Morris sash-locks			1.50	
Shutter-rings and staples			1.00	
1 doz. hand-rail braces			1.10	
10 galv. iron outside shutter-bars,	@ .25 each,		2.50	
10 " turn-buckles,	" .16 per pair,		1.60	
6 doz. hat and coat hooks,	" .12 " doz.		.72	
1 " cupboard-catches			.80	
Inside shutter-fittings and hinges			1.00	
Drawer-pulls, bolts, and sundries			2.00	
50 lbs. 20 *d.* nails,	@ .03½ per lb.,	1.75		
350 " 10 "	" " "	12.25		
150 " 8 "	" .03¾ "	5.62		
300 " 6 "	" .04 "	12.00		
			31.62	
240 " sash-weights,	" .01½ "		3.60	
180 ft. yellow-pine for stair,	" 35.00 per M.,		6.30	
Ash hand-rail			10.00	
500 ft. white-pine shelving,	@ 40.00 per M.,		20.00	
20 lbs. sash-cord,	" .50		10.00	
250 days' carpenter-work,	" 2.50		625.00	
				1,309.29

PAINTING.

Item	Total
Painting all wood-work, inside and out, and coating shingles with crude petroleum	140.00

TIN-WORK.

Item	Rate	Amount	Total
150 ft. valleys and flashing,	@ .03 per ft.	4.50	
130 " gutter,	" .20 "	26.00	
150 " rain-pipe,	" .15 "	22.50	
			53.00

PLUMBING.

Item	Rate	Amount	Total
Drive-well 20 ft. deep		40.00	
Lift and force-pump		10.00	
500 gal. tank		25.00	
50 ft. ¾ inch. A. A. lead pipe,	@ .30 per ft.	15.00	
30 " ½ " " "	" .20 "	6.00	
30 " 1½ C lead pipe,	" .20 "	6.00	
4 ½ inch. brass composition cocks		14.00	
1 copper bath-tub		14.00	
1 pan closet		10.00	
1 galvanized-iron sink, 18″ x 24″		4.50	
1 " boiler, 30 gal.		19.00	
50 ft. 4 inch. cast-iron soil-pipe,	@ .30 per ft.	15.00	
Trap and connections		6.00	
Lead, traps, couplings, etc.		4.50	
Plumbing-work, 6 days,	@ 4.00 per day,	24.00	
Helper, "	" 2.00 "	12.00	
			225.00

HEATING.

Item	Rate	Amount
Heater		40.00
40 ft. round tin-pipe,	@ .50 per ft.	20.00
50 " 4″ x 12″ wire-lath,	" .60 "	30.00
6 registers,	" 2.00 per register,	12.00

Single-oven range, with water-back			$50.00	
Setting above work, 4 days,	@	4.00 per day	16.00	
				$ 168.00
				$2,498.34
Builder's profit,	"	.08 per cent,		199.84
				$2,698.18
Architect's commission.	"	.05 " "		134.96
				$2,833.14

THE ILLUSTRATIONS.

HOUSE OF A. T. LYMAN, ESQ., WALTHAM, MASS. MESSRS. HARTWELL AND RICHARDSON, ARCHITECTS, BOSTON, MASS.

THE original house upon this site was built nearly one hundred years ago, having been added to and built upon at various times since until it reached nearly to the dimensions of the present building. Further changes being desired and examination having shown extensive repairs to be necessary, it was decided to rebuild upon the original spot, retaining certain rooms in their old places and so far as might be preserving the character of the old work. The result is a new building similar in the general disposition of its parts to the old, but higher, and deeper, with bay-windows, porch and staircase which had no counterparts in the original, and with much added internal accommodation. The pilasters upon the front of the second story of the bay windows, (some of which also appear upon the garden front) are relics from the original building. A few old bits of interior detail are also preserved, but with these exceptions, everything which appears is new work.

GRAMMAR SCHOOL-HOUSE, STEELTON, PA. MR. GEORGE A. CLOUGH, ARCHITECT, BOSTON, MASS.

COMPETITIVE DESIGNS FOR A $3,000-HOUSE SUBMITTED BY "*Bboul*" AND "*Spring Chicken.*"

SHOULD any of our non-professional readers desire to build according to either of these designs, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

"'*Bboul's*' plan is remarkably like that of '*Bumpkin*,' but suffers by comparison with it. The dining-room and parlor do not communicate as those of the latter do, and upstairs the chambers are too isolated, and there are no back stairs. Nevertheless, the plan is one of the best presented for a dwelling for all the year round. The attic is well utilized, and the basement fitted up for a laundry and water-closet. '*Bumpkin*' has worked-in four rooms at a little additional cost, and '*Bboul*' could probably do the same if desired. Of the elevation nothing but praise need be said. An almost quaker-like simplicity, combined with a bold accentuation of the sky-line, gives at once a refined distinction to the design, which gains much also from its excellent proportions, and from the well-balanced relation and distribution of the window openings. From the economical side this design offers a reliable solution of the problem, and could be carried out with every indication of the owner's ultimate satisfaction. The drawings are neat and pains-taking, yet with no lack of artistic sentiment. This careful drawing from a skilled hand is a pleasing contrast to the wanton neglect shown too often by facile and brilliant draughtsmen.

"'*Spring Chicken.*' Very good scheme; simple and economical in plan, and the exterior judiciously treated. The parlor and dining-room and kitchen grouped about the same chimney, which, however, is not made use of in the second story. The dining-room can only be reached through the parlor, which defect is mitigated by communication from kitchen to front-hall. Back stairs done away with by using the front flight, which thus cannot be left with an open balustrade into hall, but ascends between solid walls. Bedrooms well arranged, and bath-room placed properly over kitchen. Closets too large for size of house. The attic stairs, chambers, and tank disposed so that not a foot is wasted. The details are good and the drawing crisp, with, however, a dangerous tendency towards coarseness. To sum up, a capital solution of the problem from the most economical point of view."— *Extract from the Jury's Report.*

BUILDING SUPERINTENDENCE. — XXVIII.

WE now know the necessary sizes of timbers, and form of piers and buttresses, for carrying out our provisional sketch of the building into definite drawings, and we proceed to lay out our floor-plans and elevations, continuing, after these are well studied, to construct a foundation-plan in accordance with them. The elevation may be first taken up, as upon this will in a great degree depend the details of the completed plan.

We have seen, from the investigation just made, that the walls of the central portion of the building, which supports a hammer-beam roof, will need to be buttressed, to support the tendency of the roof to spread, while those of the portions containing the stage and gallery, being covered by roofs which are tied at the feet of the rafters, and therefore have no lateral pressure, do not require buttresses. Our calculations have shown that buttresses two feet wide on the face, and projecting 20 inches, will fulfil the conditions of stability, but if the effect or the proportion should require it, we need not hesitate to vary from these dimensions, only assuring ourselves, in case of doubt, that the new form will be equally suited to resist the thrust of the roof. The projection of the buttresses on the middle portion of the façade will give it a marked character, heightened by the long side windows of the central hall, which are not needed, and are rather in the way, in the stage and gallery portions; and to differentiate still further the middle of the building from the ends, we will carry up a low parapet over the windows of the hall, behind which a wide and deep gutter can be formed to keep the drip from the eaves away from the central doorway. The corresponding portion of the ridge may also be distinguished by a cresting of metal or terra-cotta, and the three-fold division of the interior thus "accused" upon the exterior, without interrupting the uniformity of the roof-surfaces which we think desirable.

The buttresses of the middle portion of the walls must obviously be supported from below, and will appear in the first story as piers. The curtain wall which connects them in the second story need not, however, be prolonged to the ground, if there is any other way of supporting it, but may have its position transposed in the first story, if we desire. As some of the smaller offices in the first story and basement occupy but one bay of the façade, we can save twenty inches of room in them, besides improving the effect of the front, without adding to its cost by adopting this disposition, and transferring the curtain wall, or "wall-veil," as some persons prefer to say, in the first story, to the exterior instead of the interior line of the buttresses. This will take away the support from beneath the small portions of the upper wall between the buttresses and the window openings, and under the windows themselves, so we will have flat segmental arches turned in those places, which will show just under the ceilings of the first-story rooms, but will be out of the way. The interval which will be left between the top of the first-story wall and the sills of the second-story windows we will treat as series of small balconies, accessible from the windows, with stone floors, and a parapet wall. This balcony wall will stop at one end against the staircase tower, and may be prolonged at the other end so as to form a kind of shallow porch over the side doorway, with a narrow balcony on top, furnished with a door opening from the room under the gallery; all of which will help to break up and make interesting a front otherwise rather monotonous.

We shall find some difficulty in preventing the tower from looking like the steeple of a church, which the building already resembles rather more than we wish, but we will see if that unfailing resource of the architectural designer, the expression on the exterior of the building of

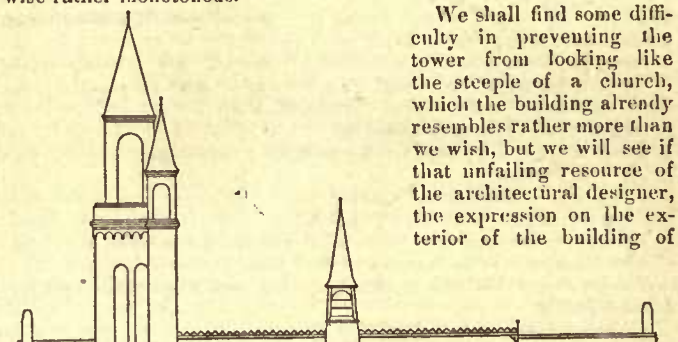


Fig. 189.

the distribution and uses of the interior, may not help us. Remembering that a portion of the tower, which contains the staircase leading to all the upper portions of the building, must be reserved as a ventilating shaft, to carry the foul air from the different portions of the building, we will "accuse" the shaft by making it project four inches from the general surface of the tower wall, above the first story, and will give it a special termination at the top. We shall need, for the best results, a shaft of something like sixty square feet sectional area, and this can be obtained in the manner indicated.

The offset of four inches which would naturally be made in the tower wall about at the second-story floor we will make on the outside, instead of the inside, thus giving it an air of greater apparent stability by the enlargement of the base. The outside of the wall of the ventilating shaft may be made continuous with that below, while the change in thickness of the other portion may be emphasized by placing at that point a balcony, supported by stone corbelling, which will serve to shelter the stage entrance to the hall, and will always be useful, at times of public demonstrations, to the guests of the town officers, who will obtain access to it by a door. The top of the tower would naturally be used to some extent as a lookout, and a bell would probably be hung there, so that the flat platform with

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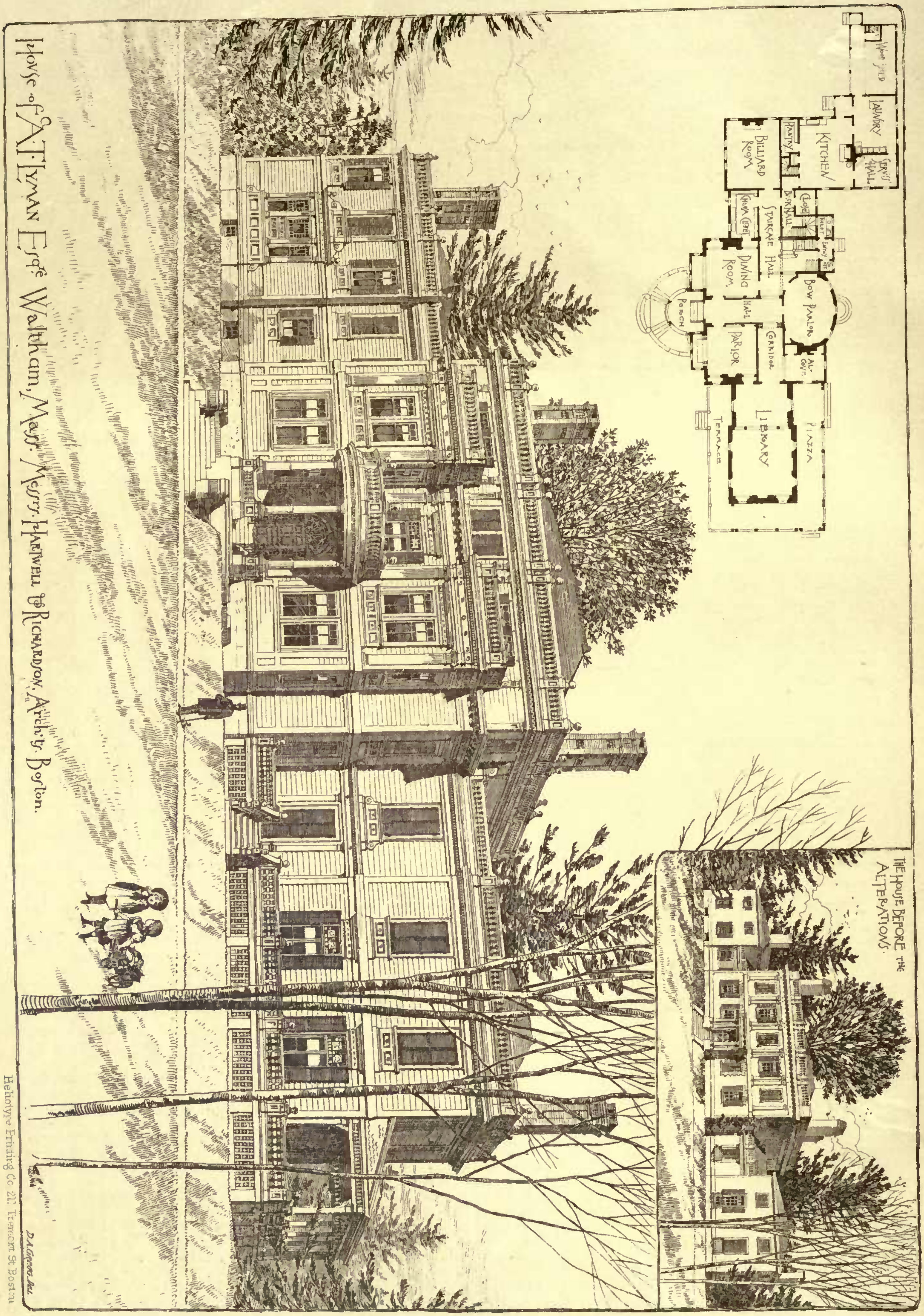

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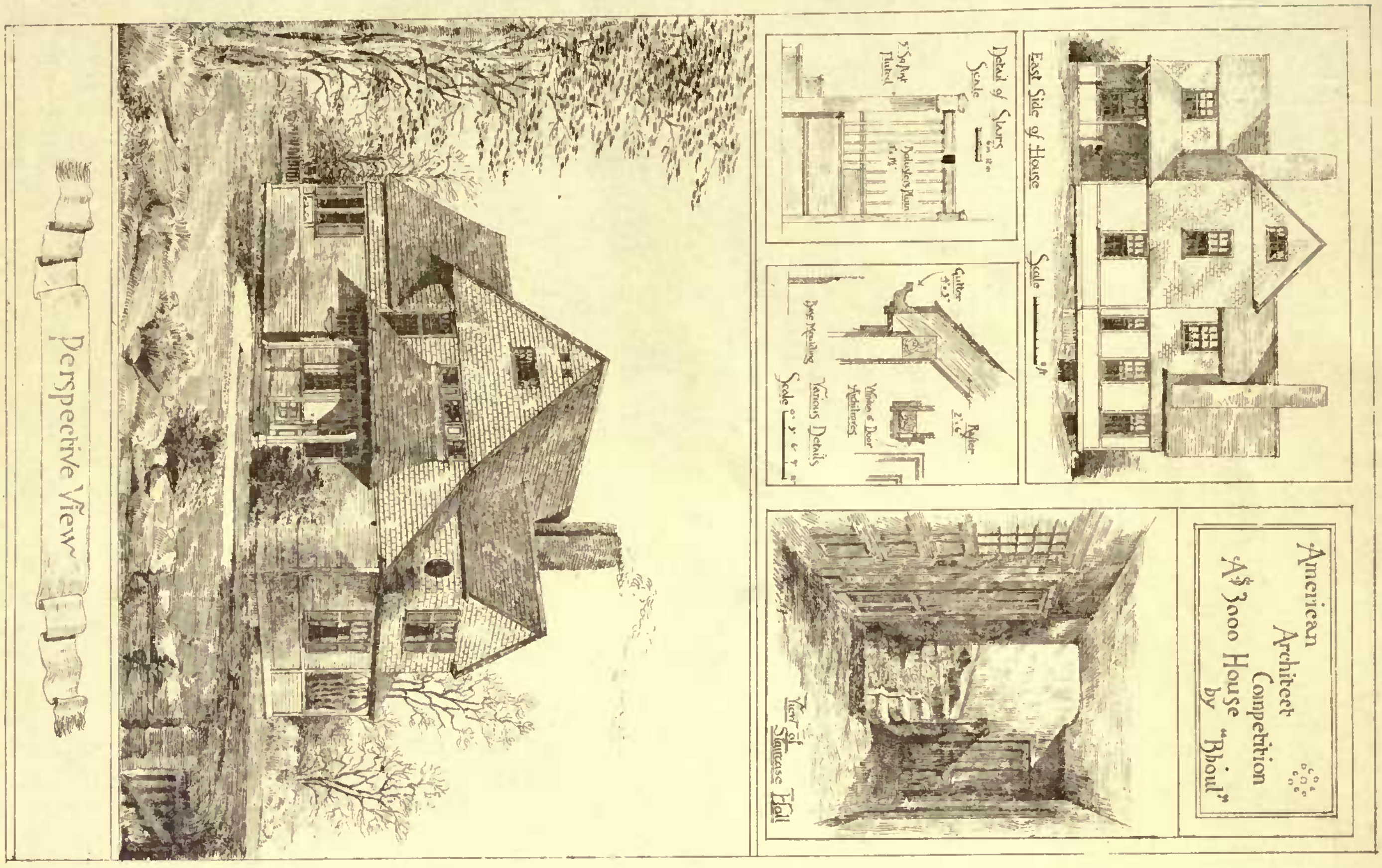

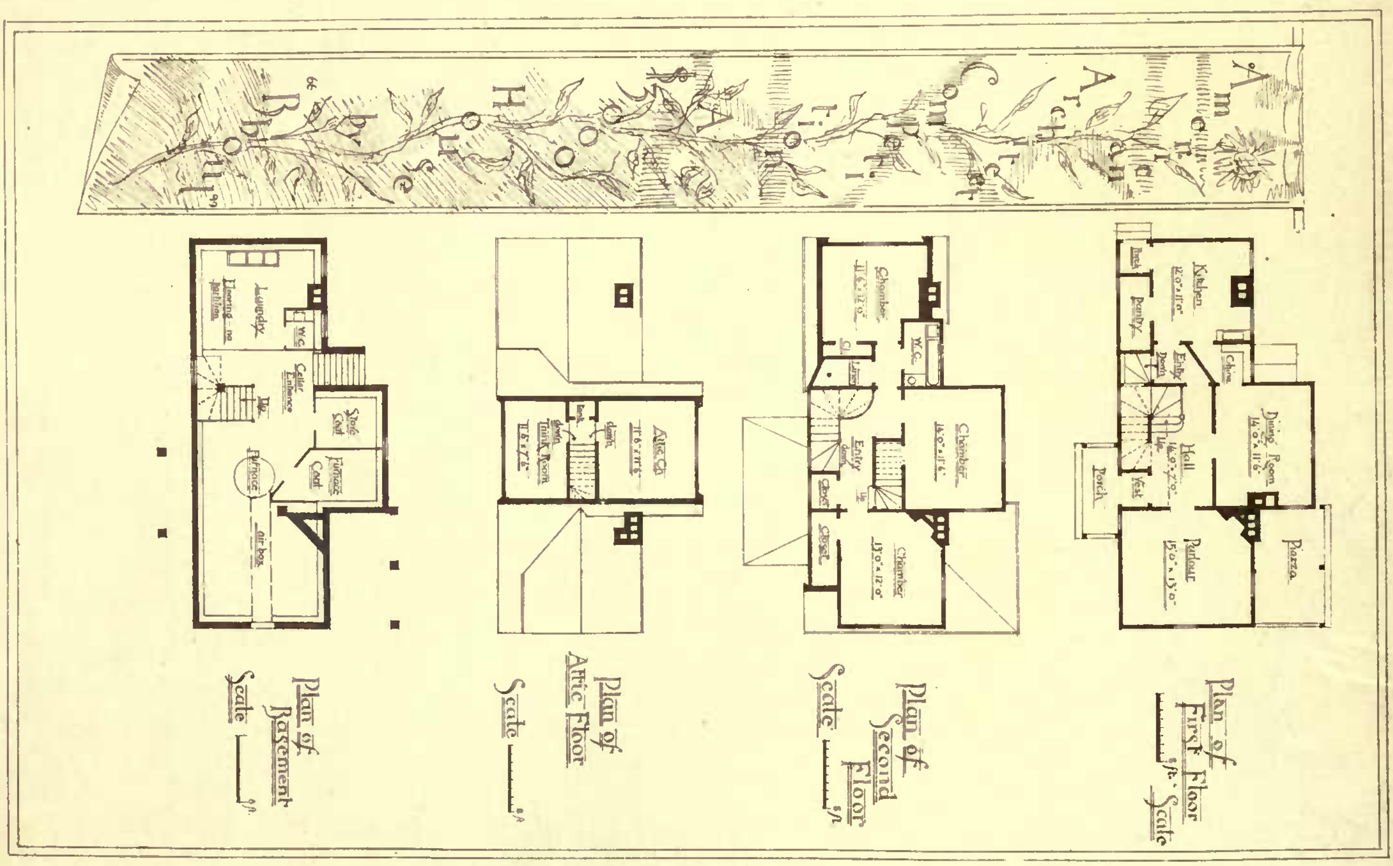

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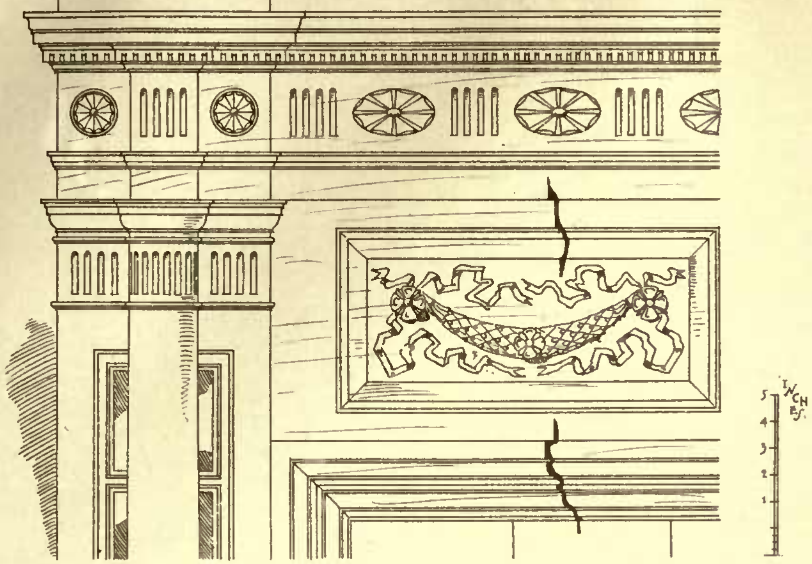
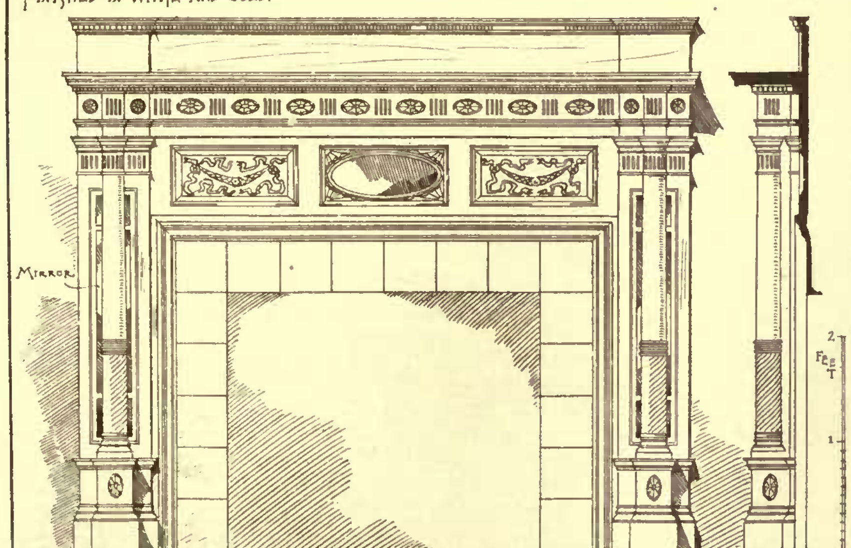
House of A. L[illegible] Esq. Waltham. Mass.

Messrs. Hartwell & Richardson, Architects, Boston, Mass.



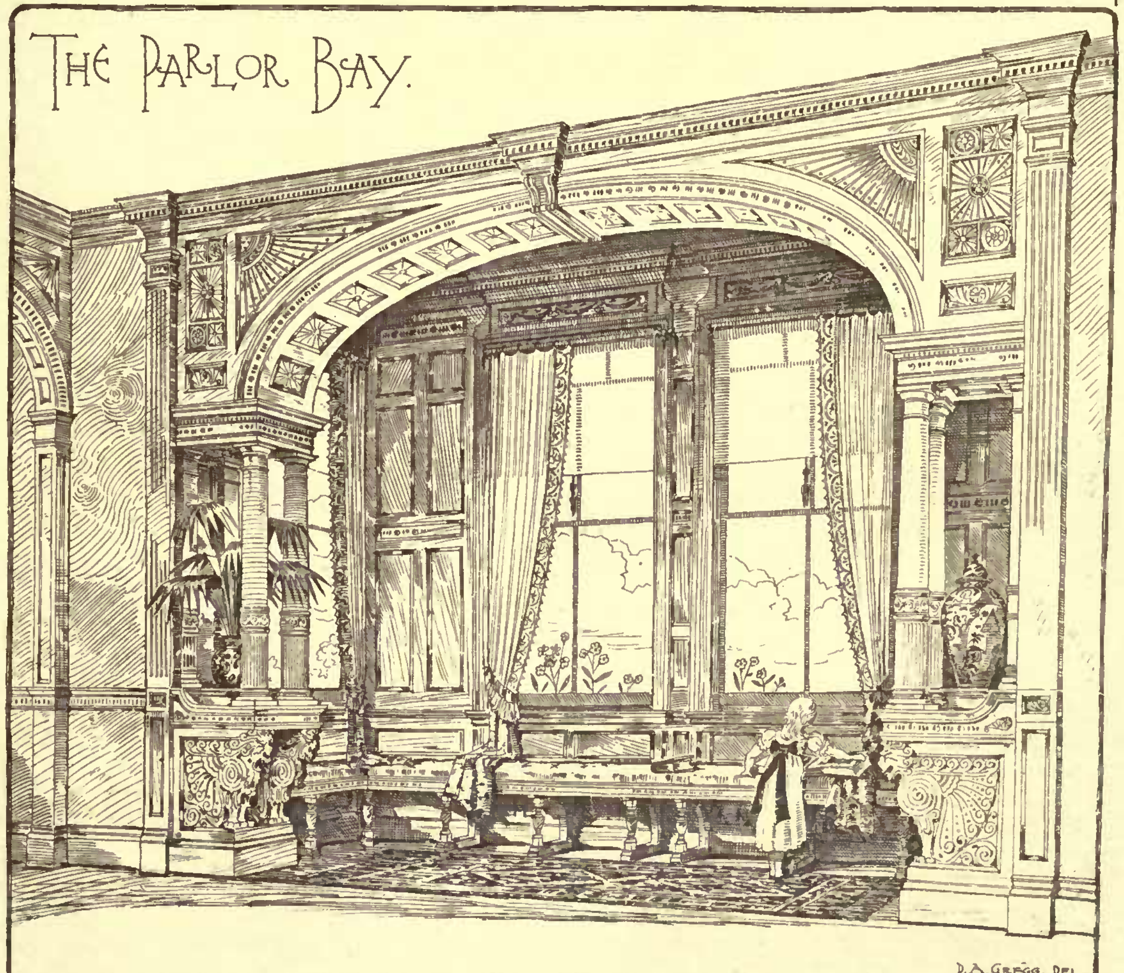
Bow Parlor Mantel. Details.

Details of Arch in Hall.



Bow Parlor Mantel. Section

The Parlor Bay.



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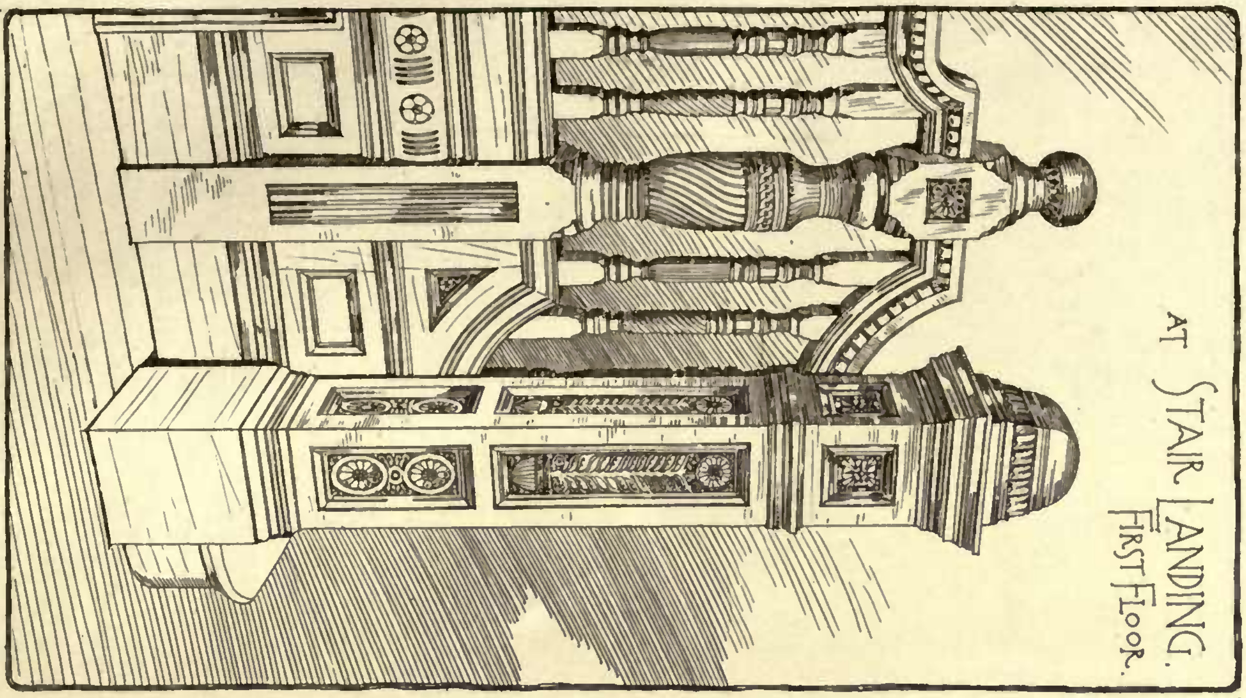
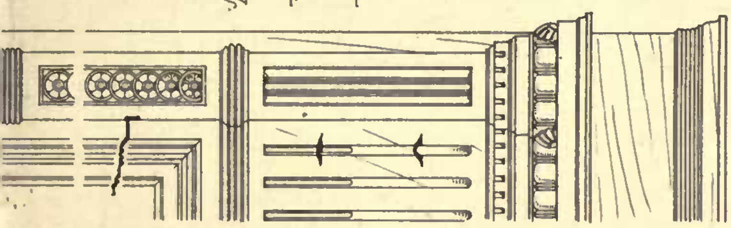
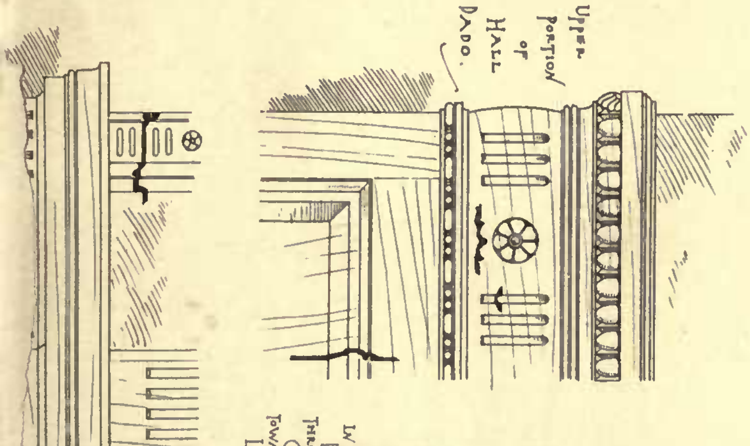


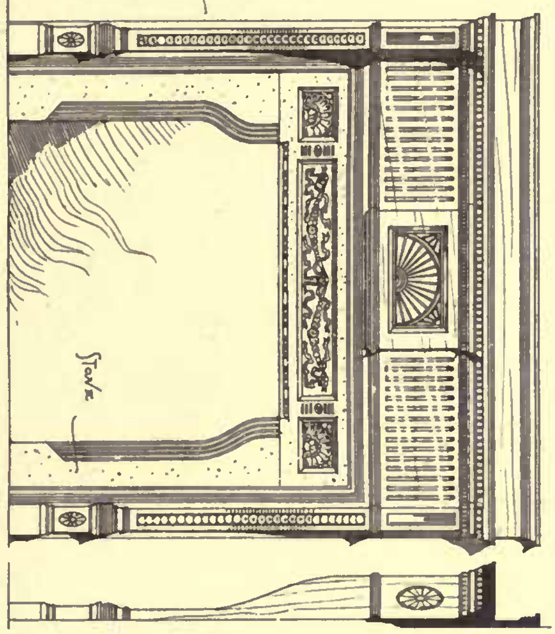
Mantel in Alcove Details.



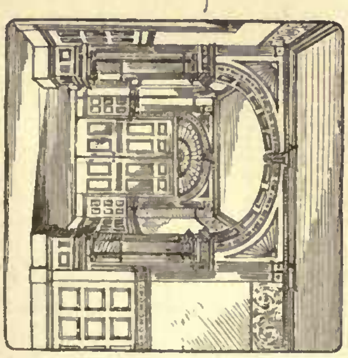


Upper Portion of Hall Dado.

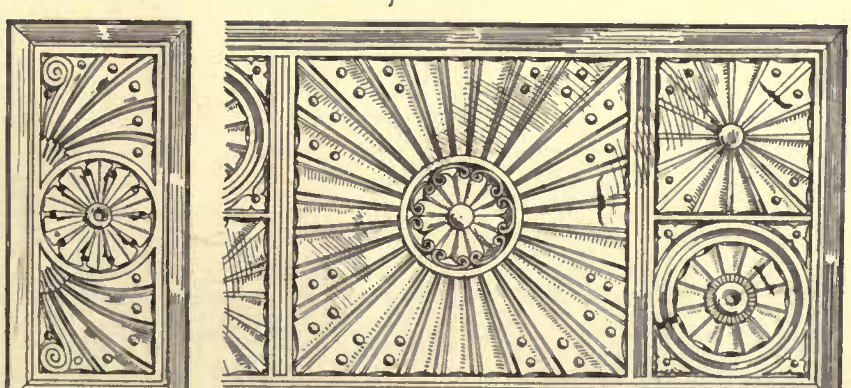
Mantel in Alcove, First Story.



In Hall, Looking Through Corridor Towards Library.



Carved Panels in Parlor Bay Arch.



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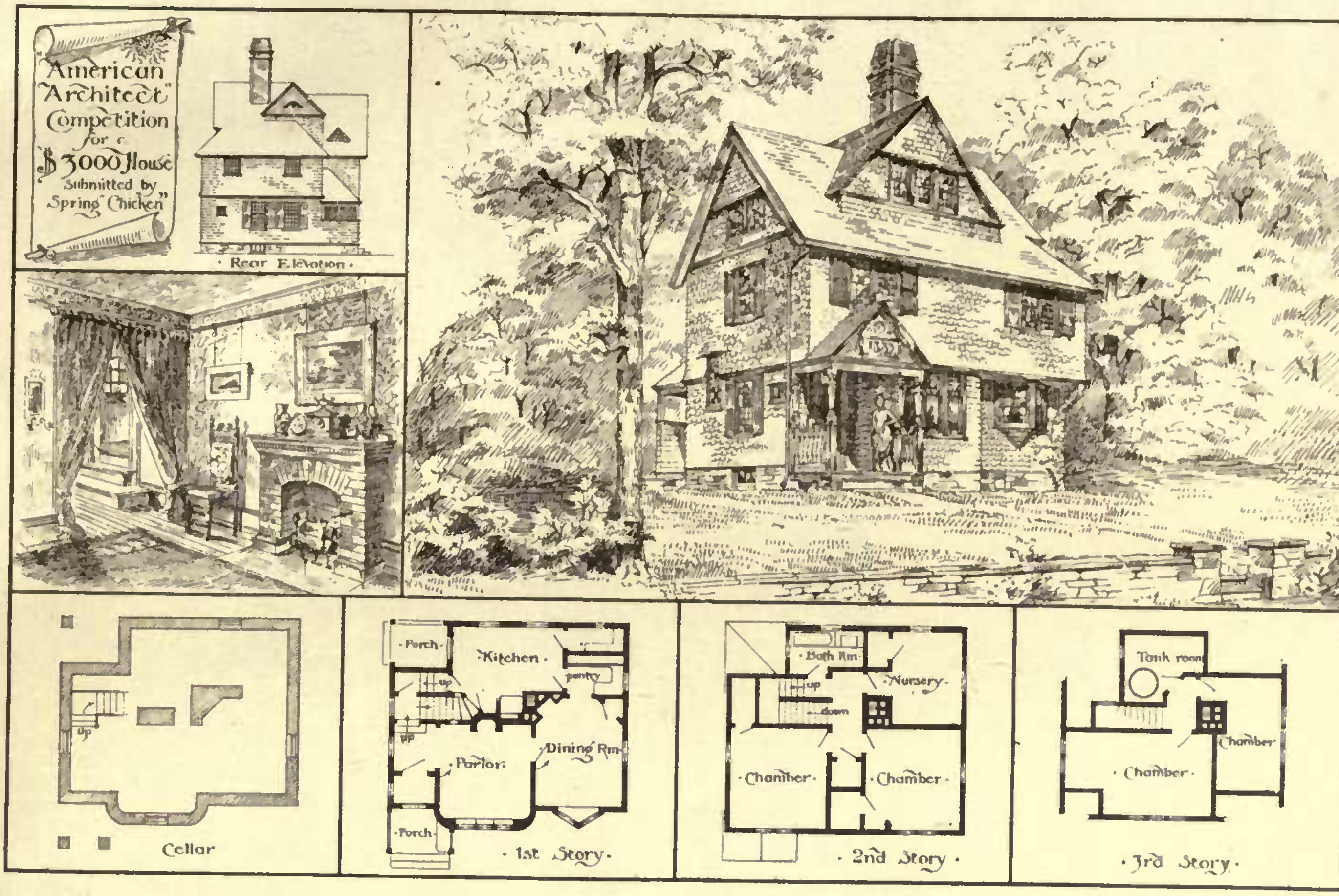

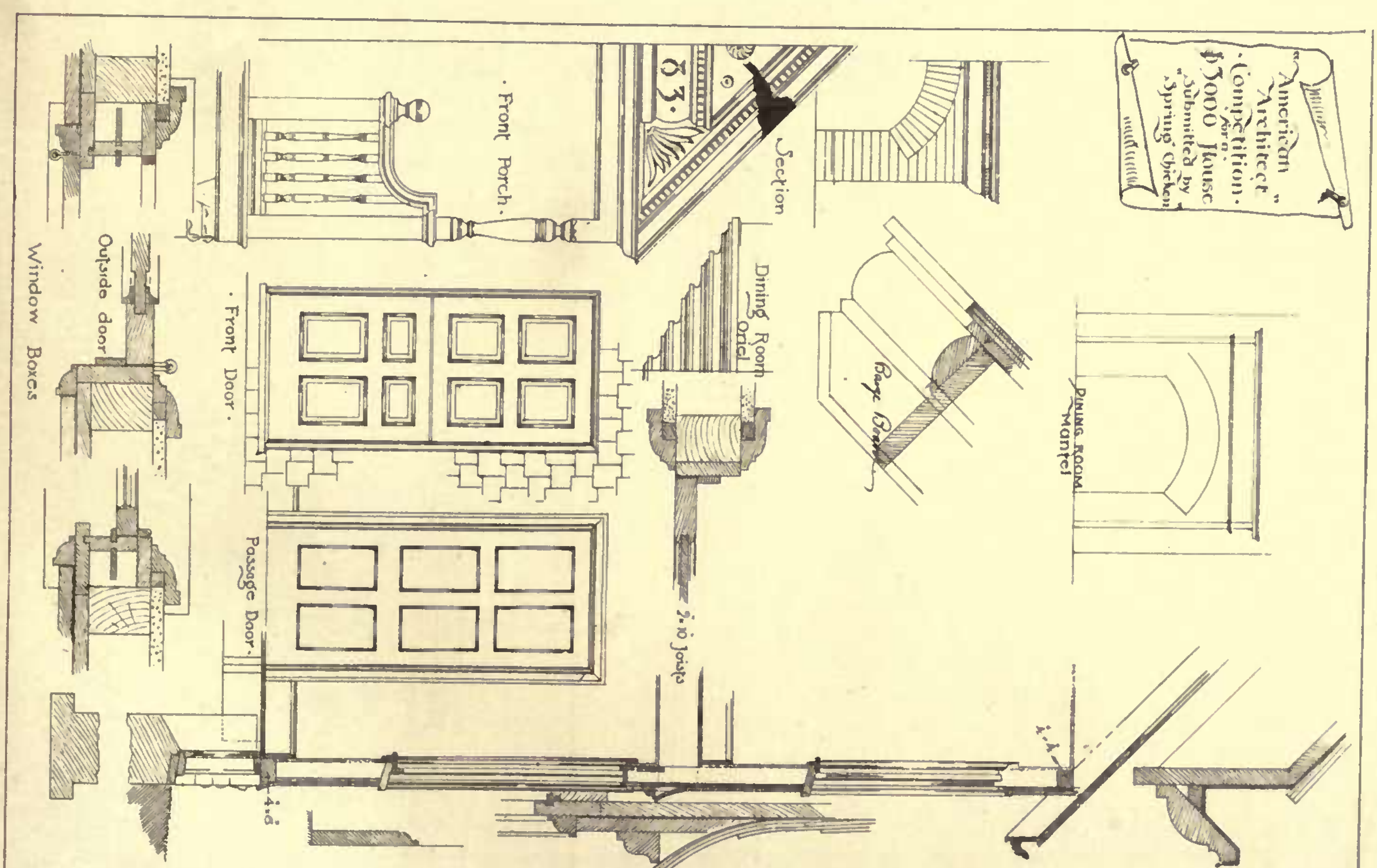

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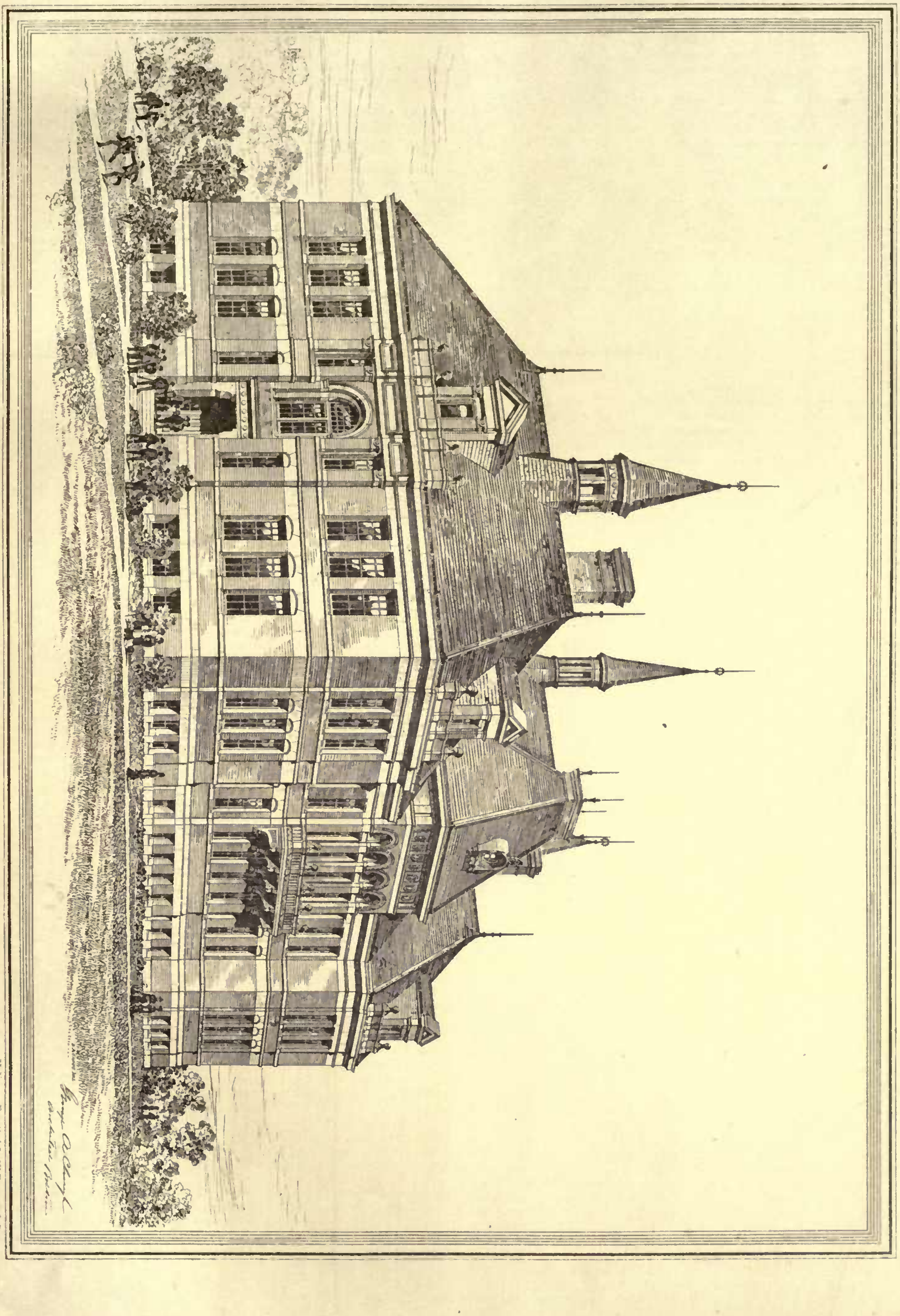

GRAMMAR SCHOOL HOUSE – STEELTON – PA

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parapet, and wooden belfry a little in retreat, will serve both purposes. To complete the exterior features we should add a ventilating turret over the middle of the roof, which will be indispensable in hot weather, to withdraw rapidly the air just under the roofing, which is intensely heated by the sun on the slates, before it can diffuse itself into the atmosphere below, and two chimneys will be necessary, which can conveniently be placed in the walls of the end gables.

The elevation of the opposite side will be substantially the same as the front, with the exception of the tower and doorways, and the end walls will be pierced only with a few windows.

Before we can fix the weights upon the different portions of the foundation, which will determine the spread of the footings and the number of piles under them, it will be necessary to fix definitely the thickness of the walls. For the front, since the piers between the windows are somewhat slender, we have already decided to make them 16 inches thick, adding the projection of the buttresses to this, and as this wall is well tied by the floor-beams which rest in it, the same thickness, 16 inches, will be sufficient for the portions at the ends, which have no buttresses.

The gable walls are under very different conditions, being much higher than the others. The lower portion, beneath the stage and gallery floors, is slightly steadied by the interior partition-walls, which are to be well anchored to it; but above this floor the wall stands free to the roof. As the roof cannot well be tied very strongly to the gable walls, it will be safest to regard these as unsupported above the ground floor, and to give them the thickness required for independent stability. This can be readily calculated by Rondelet's empirical rule. Laying off the height of the wall above the ground, at any scale upon a vertical line, we set off horizontally from the foot of the vertical, at the same scale, the distance between the cross-walls or other supports which bound the wall whose thickness we wish to determine. Connecting first the extremity of the horizontal line, by a diagonal, with the top of the vertical line, we then divide the vertical line into twelve equal parts, and, with one of these parts as a radius, describe an arc from the top of the vertical line, cutting the diagonal, and from the intersection of this arc with the diagonal let fall a second vertical line. The space between the two vertical lines, at the scale of the diagram, will represent the necessary thickness of the wall.

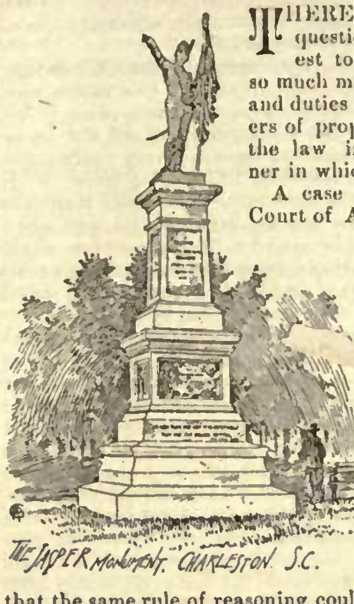
In our case the gable is 96 feet high from the second floor to the apex, and 70 feet wide between the supporting return-walls; and applying the rule we find the thickness necessary to stability to be about 4 feet.

It is obvious that although this may be the proper thickness of the wall at the foot, some economy may be made in the upper portion without diminishing the stability of the mass, since the lowering of the centre of gravity will compensate for the loss of weight. If the wall were rectangular, it might, by successive offsets, be reduced from four feet to sixteen, or even twelve inches, at the top, but the peak of a gable is less solid and steady than the corresponding portion of a rectangular wall, and we shall do best not to reduce it below twenty inches in thickness. It is quite possible that a smaller amount of material might be so distributed, by means of buttresses, as to give the stability needed, but this, we suppose, would involve in our case certain objectionable conditions, so we accept the result of our calculation, and draw the section of the wall in accordance with it, making the average thickness 34 inches. The tower walls are next to be considered. These are strongly held by the return walls, which tie it back in such a way that it would be almost impossible for them to fall over, so that it is hardly necessary to give them more than the thickness required for resisting the crushing strain due to their own weight. The walls being 134 feet high, the Rondelet diagram gives for them a thickness of 20 inches, which is unquestionably sufficient, but public opinion, for some reason, generally demands the thickest walls for towers, which need them least, and in deference to this, as expressed by our committee, we will make the lower portion 28 inches thick, diminishing the upper part by two offsets to 16 inches, as a compensation for the excess of material used below. This, while improving the appearance of the building, will really be judicious as a matter of construction, inasmuch as a solid brick wall 134 feet high, and 20 inches thick, although under the circumstances perfectly stable, would be subjected to a crushing strain at the base of 7½ tons to the square foot, which would be increased again upon the piers at either side of the doorway, by the arch, which throws upon them the weight of the mass above it, to about 12½ tons. To this weight again might be added a further strain due to the action of the wind on one side or the other, amounting possibly to 10 or 12 tons more. This would give a stress which ordinary brickwork could not with perfect safety be trusted to bear, but the increase of the mass at the lower part of the tower, with the lightening of the upper walls, will relieve us of all anxiety upon this point.

The variations in the thickness of the masonry will be made at somewhat irregular heights, to suit the exigencies of the openings and the ventilating shaft, but a little study of the section will give us, we suppose, an average thickness of 22 inches.

The interior walls, with the exception of that forming the abutment, opposite the tower, of the proscenium arch, which will have the same thickness as the arch, are not of great height, and are steadied by the floor-beams, so that 12 inches will be sufficient for them.

ACTIONABLE NUISANCES.



THE JASPER MONUMENT, CHARLESTON, S.C.

THERE are says "A Barrister," few questions of such importance and interest to the general public as to which so much misconception exists as the rights and duties respectively of neighboring owners of property, and the obligations which the law imposes with regard to the manner in which such property should be used. A case was recently heard before the Court of Appeal, which forcibly illustrates the difficulties of attempting to define a man's duty towards a neighbor whose occupation or calling is absolutely incompatible with neighborly relations. A student would find it difficult, if not impossible, to devote his mind to study if his next-door neighbor should keep a printing-machine at work at all hours of the day or night. The physician, the surgeon, or the artist would find it equally impossible to pursue their avocations in a locality devoted to noisy trades. But it is evident that the same rule of reasoning could not be made to apply to Whitechapel as to Belgravia. What might be fairly considered the ordinary avocation of a man in Whitechapel could not be regarded as an ordinary incident of life in Belgravia. The same principle could not be applied with logical strictness to the two localities.

Lord Justice Thesiger has in fact insisted that the principle is the same, but its application should be controlled by the time and circumstances of the case. For instance, it would result in the most serious practical inconvenience if a man might go, say into the midst of the tanneries of Bermondsey, or into any other locality devoted to a particular trade or manufacture of a noisy or unsavory character, and by building a private residence on a vacant piece of land put a stop to such trade or manufacture altogether. The case is also put of a blacksmith's forge, built away from all habitations, but to which in the course of time habitations approach. Lord Justice Thesiger did not think that either of these cases presented any real difficulty. As regards the first, it may be answered that whether anything is a nuisance or not, is a question to be determined, not merely by an abstract consideration of the thing itself, but in reference to its circumstances. What would be a nuisance in Belgrave Square would not necessarily be so in Bermondsey, and where a locality is devoted to a particular trade or manufacture, carried on by the traders or manufacturers in a particular and established manner, judges and juries would be justified in finding, and may be trusted to find, that the trade or manufacture so carried on in that locality was not a private or actionable wrong. As regards the blacksmith's forge, it would be, on the one hand, in a very high degree unreasonable and undesirable that there should be a right of action for acts which are not, in the present condition of the adjoining land, and possibly never will be, any annoyance or inconvenience to either its owner or occupier; and it would be, on the other hand, in an equal degree unjust, and from a public point of view inexpedient, that the use and value of the adjoining land should, from all time and under all circumstances, be restricted and diminished by reason of the continuance of acts incapable of physical interruption, and which the law gives no power to prevent. The smith, in the case supposed, might protect himself by taking a sufficient curtilage to insure what he does from being at any time an annoyance to his neighbor; but the neighbor himself would be powerless in the matter. It is admitted that individual cases of hardship might occur in carrying out this principle; but, on the other hand, the negation of the principle would at the same time produce a prejudicial effect upon the development of land for residential purposes. It will be seen therefore that, in the interests of the public as much as in private and individual interests, it is important to consider how and under what circumstances a man may restrain his neighbor from carrying on a trade in such a way as to be a nuisance and injurious to him or his property.

In the case to which we have referred the plaintiff and defendant were neighbors, and held leases under the same landlord. The defendant was a wheelwright, and since the year 1848 had carried on his trade upon the premises adjoining those of the plaintiff. The plaintiff, in the year 1875, entered into occupation of his house, which had previously been used, first, as a furniture maker's workshop, and as to the part immediately adjoining the defendant's premises, as a gas-fitter's and smithy. This portion of his premises the plaintiff converted into an artist's studio, and after the lapse of four years complained of the increased noise caused by the defendant in carrying on his business. The defendant made attempts to lessen the noise and abate the nuisance complained of, but apparently without succeeding in satisfying the plaintiff, who eventually brought his action. It was alleged by the plaintiff that the noise caused by the defendant amounted to an actionable nuisance, and there seems to have been no doubt, on the evidence, that this was so. The Court accordingly granted an injunction restraining the defendant from

carrying on his business in such a manner as to cause a nuisance to the plaintiff, and the Court of Appeal suspended the injunction for a month in order to give the defendant time to make alterations, so as to abate the nuisance or find new premises.

The facts of this case present no very unusual features, but they serve, nevertheless, to illustrate the danger which a man incurs who, engaged in any trade or occupation likely to cause annoyance to his neighbors, invests his capital on the assumption that he will be allowed, on the faith of his business having been for many years established, to continue it without interruption. The noise made by the defendant in his business did not amount to a nuisance until the plaintiff converted the old smithy into an artist's studio, and when this portion of his house came to be used for the purpose for which it was intended, the noise made by the defendant in carrying on his business became a nuisance to the plaintiff. It has often been urged under such circumstances that a man may acquire by user a right to create a noise even amounting to an actionable nuisance; but it is well to bear in mind that user of this kind, in order to support such a contention, must neither be forcible user nor user by stealth, but must be open and of right. Now a man cannot, by anything he can do on his own property, prevent his neighbor from making a noise. If he enter on his neighbor's property for the purpose he becomes a trespasser. In the case referred to the plaintiff could not even have taken action, for the reason that the noise did not become an actionable nuisance until the studio was erected. It did not hurt anybody so long as the plaintiff's premises were not required for artists' purposes. The plaintiff therefore could not have prevented the noise from continuing by action; neither could he have physically prevented it, for a man has no more control over the waves of sound than he has over the wind. No easement or right by user had, therefore, been acquired by the defendant in the present case.

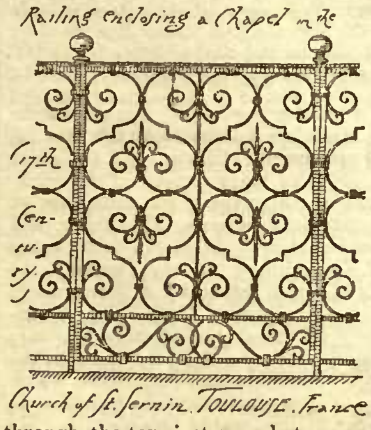
As a further illustration of the principle adopted by the courts in dealing with questions of this kind, it may be well to mention a case decided a few days ago, in which the facts were very similar to the present. A confectioner had for more than twenty years used a pestle and a mortar in his back premises, which abutted on the garden of a physician, and the noise and vibration were not felt as a nuisance, and were not complained of. The physician erected a consulting-room at the end of his garden, and then the noise and vibration became a nuisance to him. He accordingly brought an action for an injunction. The defendant pleaded that he and his father had carried on the business, which, by the way, was in Wimpole Street, for more than sixty years, and that he had acquired a prescriptive right by user to continue to do so. It was held, however, that inasmuch as the noise did not become an actionable nuisance until the plaintiff erected his consulting-room, no such right existed, and that the right to make a noise so as to annoy a neighbor could not be supported by user unless during the period of user the noise had amounted to an actionable nuisance.

This decision is founded, as in the former case, upon the principle that user which is neither physically capable of prevention by the owner of the servient tenement, nor actionable, cannot support an easement. We are still, however, as far as ever from arriving at a clear conception of what an actionable nuisance is. We are told that regard must be had not only to the thing done, but to the surrounding circumstances. What might be a nuisance in one locality might not be so in another. The truth of this latter observation is self-evident; but we are not in any way, while admitting its truth, enlightened as to the nature of the circumstances which will permit a man to cause a nuisance to his neighbor in one locality or the other. One would have thought that an artist who voluntarily selected a house which had been used first, as a furniture-maker's workshop, and, secondly, as a gas-fitter's smithy, could not have much to complain of if his neighbor was a wheelwright who found it necessary to make a noise in carrying on his business. On the other hand, the wheelwright might have a good deal to complain of in the artist who selected the old gas-fitter's shop, where a trade as noisy as his own had probably been carried on before, and dedicated this uncongenial spot to the Muses. Surely such an erratic selection might be regarded as "a circumstance" worthy of consideration in determining whether the wheelwright's business was a nuisance or not.

It may be urged, and doubtless with some degree of truth, that to allow the continuance of a nuisance would be to discourage, if not altogether to prevent the development and improvement of the property in the neighborhood. But wheelwrights are as necessary to the community as artists, and we should hardly suppose, from what appears on the evidence to be the character of the property in question, that the wheelwright's business was at all out of place, or that the artist's studio was likely to be any permanent improvement upon the gas-fitter's smithy. The rapid increase of building operations in our large towns, and the constant changes, often difficult to account for, in the character and value of house property, and the uses to which it is devoted, render considerations such as those to which we have adverted of the utmost importance in determining the merits of cases of this kind, and it would almost seem that such "local circumstances" were not sufficiently taken into account in determining upon the respective claims of the artist and the wheelwright in the case we have quoted. — *The Architect.*

Oyster-Shell Windows.— The windows of houses in the Philippine Isles are made of pellucid oyster shells, which admit light, but cannot be seen through.

THE DONJON OF COUCY.



A LETTER from Coucy-le-Château to the Philadelphia *Telegraph* says: —

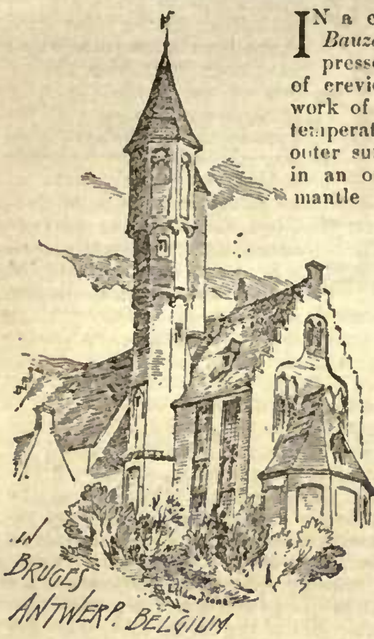
Coucy-le-Château stands upon a crest of a hill, with an old village not very far from it, most of the houses in which have been built from the débris of the castle. For in 1652, during the wars of the Fronde, the magnificent château was besieged by the orders of Cardinal Mazarin, and after a stout resistance it fell. Then Mazarin gave orders to have the place dismantled, and a mine was fired beneath the grand tower of the donjon. The explosion blew everything through the top, just as a shot passes through a cannon, but though deep fissures were made in the walls, the tower remained standing. Then for generations the people of Coucy helped themselves freely to all the stones and masonry which they happened to want, until at last the French Government undertook to protect the ruin, and now an old soldier takes care of it, and the Government is propping up the walls and closing up the fissures. Fortunately, a complete restoration, such as that which M. Viollet-le-Duc carried out at the Château of Pierrefonds, is impossible. The castle will always remain a ruin, but such a ruin as must fill every beholder with wonder and admiration. M. Viollet-le-Duc strongly recommended romancists and historians, instead of drawing upon their imaginations for a vivid description of mediæval life, to go and see this sombre pile. Nothing, he says, can give a better idea of the feudal times than this superb monument which even the earthquake has not been able to cast down. Victor Hugo profited by this advice, and we have the result in *Quatre-vingt-Treize.*

As one stands at the foot of the tower and gazes upwards to the summit, where the battlements remain unbroken, it is impossible to repress a feeling of amazement, not only at the prodigious character of the work, but at the thought that the whole of this part of the castle was built in five years — that is to say between 1225 and 1230. It was the famous warrior, Enguerrand III, who constructed this immense pile at a time when, as it is believed, he aimed at nothing less than to seize the Crown of France. The magazines beneath the walls were capable of holding ample supplies of provision for 1,000 men for a whole year. On a single floor or story of the donjon 1,500 men could easily have been assembled. The tower is 187 feet in height and 335 feet in circumference, and the walls are thirty-four feet in thickness. If the reader will compare these dimensions with those of any other tower known to him in New York or elsewhere — even with those of the famous tower near the City Hall which was once so great a source of amusement to the *Sun* and its subscribers — he will be able, perhaps, to form a faint idea of the imposing appearance which this mass of masonry must present. It was built to last forever, and it seems likely, at least to endure as long as any other of the works of man. But the sires of Coucy have passed from the earth. It was a fighting race, and most of them perished on the field of battle. The son of the builder of Coucy, Raoul, fell at Mansourah, in Egypt, and the last of the Enguerrands died in a foreign land in 1396. In 1400 the castle came into the possession of Louis of Orleans, and in the Orleans family it still remained until the days of Louis Philippe of Orleans, called "Egalité." Now it belongs to the French Government, and ever since 1856 large sums of money have been spent in carrying out necessary repairs. The walls were, as M. Viollet-le-Duc says, "*lezardé*" by the explosions of the mines of Mazarin's engineers, but now these yawning chasms are only marked by the new blocks of masonry which have been inserted. The venerable appearance of the ruins has not in any way suffered.

The tower so impressed me that I have scarcely ventured to refer to the other parts of the castle, although they are considerable in extent. There are four other to[illegible]rs at each corner of the château, inclosing guard-chambers, be[illegible]h which are three stories of dungeons accessible only by a larg[illegible]l hole in the middle of the floor: down this hole the prisoners[illegible]wered, and slight indeed must have been their hope of eve[illegible]ng out alive. Women and men alike were inclosed within the[illegible] gloomy vaults, the victims of the fierce raids which the sires of Coucy made upon all the surrounding country. Enguerrand the Great carried his ravages as far as Leon, and on one occasion he bore off the dean of the cathedral there and shut him up in one of his fearful dungeons. As the old soldier who now acts as guardian told us, only "distinguished prisoners" were made captives in these dens — the other sort were taken outside the walls and hanged. There never could be the least hope of escape for any one who crossed the drawbridge. The town outside was surrounded by massive walls, which still remain, and between the town and the castle were two enormous moats and another range of walls, and then the donjon, and the guard-chambers beyond. Perhaps the prisoners who were least to be pitied were those who met their fate at once at the hands of the executioner.

You will remember the picture which Victor Hugo draws of the dungeon in which first the old Marquis, and then his deliverer, the young Vicomte, were immured. The very place exists to this day at Coucy.

THE BRICKWORK OF CHIMNEYS.



IN a communication to the *Deutsche Bauzeitung*, Herr Eckhartz has expressed his opinion that the cause of crevices being formed in the brickwork of chimneys is the difference of temperature between the inner and outer surfaces. While in many cases in an ordinary factory chimney the mantle has internally a temperature of nearly 600° Fahr., the external temperature is only about 60° on an average, the difference of expansion which is thus occasioned producing the cracks referred to. He dwells upon the use of iron hooping, and remarks that its object and result are not, strictly speaking, the prevention of expansion, but rather the attaining in the outer brickwork of a uniform distribution of the tension, and the prevention of its concentration at certain points.

The question whether wrought-iron rings in the inside of a mantle are liable by their own expansion to produce cracks, has been for some time under discussion in German technical circles. A short time ago, Dr. Tomei recorded in the journal referred to, his opinion that the binding of chimneys by means of iron inside the masonry was a measure only to be recommended in exceptional cases, and with the observance of special care in its execution. He considered that the external binding of brickwork was, however, a question which was to be regarded in a different light. Herr Eckhartz, though not founding his remarks exactly on those of Dr. Tomei, further illustrates them by saying that if iron-work placed internally fails to prevent cracks, and even produces them, its employment in that way is not only superfluous, but injurious. If rightly constructed, he considers that for resisting the effects of the wind, no hooping is required by a chimney. In further elucidation of the theory that internal hooping is unsuitable, he remarks that the iron-work should, as a matter of course, not be exposed to a high temperature; and he maintains that all rings inside masonry must, under these circumstances, be subjected to the influence of heat. If they have not sufficient space for their expansion, they exercise a pressure upon the external brickwork, and thereby produce cracks.

From the facts thus quoted Herr Eckhartz deduces the recommendation that in order to provide against the results of the difference in temperature to which allusion has been made, double walls should be constructed. He refers to the chimneys for circular furnaces which have been designed on this principle by Herr Hoffmann. He uses double mantles, each only half a brick in thickness, which are united by vertical ribs of the same thickness. Inside the chimney is an isolated mantle, half a brick thick, which is built up to the height of 11 to 22 yards, according to temperature ruling in the chimney. This mantle is exposed to the most intense action of the heat, and from the nature of its construction is not injuriously affected by any extension which takes place. Herr Eckhartz claims for this method of construction the subsidiary advantage of economy in fuel, and adds that his personal experience confirms him in the opinion that it is the only system by the use of which iron hooping can be completely dispensed with.— *The Builder.*

MONTHLY CHRONICLE.

MARCH 1. Burning of Lyken's Opera-House, Columbus, Kan.
March 11. The roof of the Payret Theatre at Havana, Cuba, falls at midday, crushing several persons.
Death of Prince Gortschakoff, ex-chancellor of the Russian Empire.
March 12. The court-house of McPherson County at McPherson, Kan., is burned.
March 15. Attempt to blow up the Government Board Office, Westminster, London.
March 16. The failure of a gallery support causes a panic in the Cosmopolitan Theatre, New York.
March 18. Fire and panic in Faranta's Pavilion, New Orleans, La., during the performance. Four persons fatally crushed.

CREMATING EXCRETA.

WYANET, ILLINOIS, March 28, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gents, — Being a reader of your monthly *Architect*, I take the liberty of asking a little information on a question of interest to me and perhaps to others. I have a small business lot about thirty-eight feet square on which I wish to build a grocery store with basement, and have convenient dwelling-rooms above on second floor. What bothers me is to know how to have a convenient and practical-working privy from this second floor on inside of building, as the building will cover the whole of the lot: we have no water-works here and very little descent of ground in any direction. Could get 5 feet by going about 80 rods, — I expect to use a drain. My idea was to build a good sized chimney from basement in connection with privy and arrange so as to dispose of soil by cremation and run the urine into drain. Do you know of this ever being done in this way and can it be made practical? If you think not, what is the most practical plan in use to obtain the results I wish?

If you should answer through the *Architect*, please publish in the monthly issue, and oblige, Yours truly,

W. YEARNSHAW.

[SOMETHING depends upon the amount of money our correspondent wishes to spend. With a tank and force-pump, soil-pipe, drain, and cesspool at a sufficient distance from the building, a good water-closet would be the most satisfactory apparatus. If this is impracticable, the common French method of building a tight vault in the cellar, or preferably outside of it, with a shaft extending vertically downward from the second story, might be carried out with comparatively little offense, by making the vault or shaft nearly or quite air-tight, and carrying up from the former a ventilating pipe, six or eight inches in diameter, well above the roof. Then there will always be a flow of air downward through the seat, which will keep the air of the closet in motion. If dry earth could be scattered over the contents of the vault each day, and the whole frequently cleaned out and disinfected with powdered copperas, the result would be still better. A still cheaper, but more troublesome appliance would be a portable earth-closet, such as any manufacturer would furnish. The cremation idea we can hardly approve.—EDS. AMERICAN ARCHITECT.]

RECENT TESTS OF BRICK.

WASHINGTON, D. C.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs,—The following report of tests of bricks made at my request upon the Government testing-machine may be of sufficient interest to builders to merit publication in your valuable journal.

M. C. MEIGS, U. S. A.
Retired.

WATERTOWN: MASS., DECEMBER 16, 1882.

COMPRESSION OF BRICKS, TESTED FOR NEW PENSION BUILDING, (SUPERVISING ENGINEER AND ARCHITECT,) WASHINGTON, D. C.

Bricks tested between flat iron compression platforms, compression faces of bricks ground flat.

No. of Test.	Marks on Brick.		Sectional Area.	Ultimate Strength. Total lbs.	lbs. per □"	Bearings.	Remarks.
2531	W. H. West & Bro.	Red	4.00" x 8 50" = 34.00□"	324,500	9,540	even.	Cracking sounds heard at 183,000 lbs.
2532	" "	Arch	3.95 x 8.50 = 33.58	255,200	7,600	{ nneven, required .01" packing	" " " 30,000 " Fractures in sight at 80,000 lbs.
2533	" "	Pressed	4.20 x 8.50 = 35.70	231,000	6,470	even	Cracking sounds heard at 125,000 lbs. Cracks in sight at 150,000 lbs.
2534	Washington Brick Co.,	Red	4.10 x 8.47 = 34.73	296,200	8,530	"	Cracks in sight at 32,000 lbs. at corner. At 130,000 lbs. specimen covered; no more cracks in sight.
2535	" "	Arch	3.80 x 8.30 = 31.54	324,500	10,290	"	Cracking sounds heard at 65,000 lbs. Specimen covered when load reached 150,000 lbs.; no cracks in sight.
2536	" "	Pressed	4.10 x 8.35 = 34.24	314,700	9,190	"	Cracking sounds heard at 68.000 lbs. Began to crack along edge at 110,000 lbs.
2537	Childs & Son,	Red	4.15 x 8.40 = 34.86	211,000	6,050	"	Began to flake along one corner at 78,000 lbs.
2538	" "	"	4.10 x 8.46 = 34.69	209,300	6,030	"	" " off at edges at 107,000 lbs.
2539	" "	"	4.10 x 8.45 = 34.65	232,000	6,700	{ .005" packing under one corner	" " " corner at 140,000 "
2540	" "	Arch	3.70 x 8.10 = 29.97	203,700	6,800	even	Cracks appeared generally at 85,000 "
2541	" "	Pressed	4.20 x 8.40 = 35.28	210,200	5,960	"	Began to flake off at one edge at 110,000 lbs.
2542	B ns, Russell & Co.,	Pressed	4.30 x 8.58 = 36.89	219,000	6,750	"	Cracking sounds at 128,000 lbs. Cracks in sight at 140,000 lbs.

(Signed) JOHN G. BUTLER,
Captain of Ordnance, Commanding.

GRANULATED-SLAG MORTAR.

Alleghany City, March 22, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Will you please inform me in the next issue of your paper as to the merits of mortar made from granulated furnace slag, as practised at the Tees Iron Works, Middlesboro, Eng., and at what other places, if any, you know of its having been used.

Yours truly, Jos. A. Shinn.

[We do not know about mortar made with furnace slag, but presume it must be used in place of ordinary sand. Brick of pressed slag-concrete are extensively used all through the Cleveland District and even in London. — Eds. American Architect.]

AN ARCHITECTURAL MUSEUM FOR NEW YORK.

New York, March 31, 1883.

To the Editors of the American Architect: —

Dear Sirs, — *Il va sans dire* that in bodies constituted of so many varying elements as the A. I. A., there is likely to be in the current work of its volunteer officers less romance than often thankless drudgery. But I will now give you and your readers a little episode somewhat flavored with that unusual former ingredient in my Institute experience.

Between two and three years ago one of the active members of the Institute and of the New York Chapter, Mr. Napoleon LeBrun, on promise of strict secrecy, told me he had exerted a certain influence which he had just received assurance would sooner or later inure to the great benefit of that Chapter and the interests which it is its aim to guard and foster. Last Friday a friend of his, Mr. Levi Hale Willard (a collateral descendent of the martyr spy, who met his death in this city during the Revolution), died of consumption, and yesterday morning, as Mr. LeBrun, a day or two after his friend's death, intimated to me would be the case, a notice like that which I enclose appeared in most of the papers. Yesterday, on seeing Mr. LeBrun he handed me the original of the enclosed copy of a posthumous letter to himself from Mr. Willard, received an hour or two before.

I commend this letter from the dead alike to those who have the means to foster what Mr. Willard thought the "grandest of all the arts," and to those who might, like Mr. LeBrun, use an unselfish influence to attract those means. The Institute would, indeed, prosper if each of its centres could be ensured such benefits as those the New York Chapter will dispense through him.

Yours truly, A. J. Bloor.

New York, November 25, 1881.

My Dear Mr. Le Brun: —

Your reception of this will be the announcement that I have passed from this world.

You are aware that I have long since made a bequest to the Metropolitan Museum of Art of money to be devoted to the founding of a museum of architecture, to be placed on exhibition in its galleries. It is a subject that has often been discussed between us for years past.

My object in writing this is to put on record my desire, lately expressed to you, that to your son, Pierre, be assigned the duty of making the collection, under the direction of the Commission designated in my will. He thoroughly understands my views and is in harmony with them, and I am satisfied would carry them out to my entire satisfaction. If my wishes can have any weight in the matter I trust they will receive due consideration.

If it shall prove that I have done something to cultivate and encourage a popular taste for this grandest of all the arts, I shall be recompensed for what I have done, although I may never know of it.

With kind wishes for you and yours, I am,

Very sincerely your friend, Levi H. Willard.

[The will of the late Levi Hale Willard, who was a large stockholder in the American Express Company, was admitted to probate in the Surrogate's office yesterday. After mentioning some minor bequests, the testator leaves to the trustees of the Metropolitan Museum of Art the remainder of his estate, to be applied to the purchase of a collection of models, casts, photographs, engravings, and other objects illustrative of the art and science of architecture, to be kept on permanent exhibition in the museum. The collection is to be made under the direction of a commission chosen by the New York Chapter of the American Institute of Architects, one member of which shall be the architect, Napoleon LeBrun. The bequest is conditioned on the funds being applied solely for the purpose designated, and no part thereof to the acquisition of antiquities or other objects not strictly relating to architecture, constructional or decorative. The expenses attending the making and arranging of this collection, as well as the annuity directed to be paid the testator's mother, may be defrayed from the revenues of the property bequeathed as received, the balance to be added to the principal so long as any portion thereof remains unexpended. In case the trustees decline to accept this bequest on the conditions prescribed, it will go under like conditions to the Trustees of Columbia College. Alexander Holland, of this city, and Robert A. McKinney, of Brooklyn, are appointed executors. The will is dated July 25, 1881, and on November 25, 1881, a codicil was added to the effect that owing to the increase in the value of the estate since the making of the will, the bequest to the Trustees of the Metropolitan Museum of Art might amount to a larger sum than would be required to fully carry out its provisions. The testator, therefore, directs that only so much of the bequest be applied to the acquisition of the architectural collection as may be required in the judgment of the commission, its members to be the sole judges of its extent and the amount to be expended thereon. The remainder of the bequest, if any, is to be employed in the purchase of landscape and *genre* pictures of the modern French school, to be added to the galleries of the museum.— *New York Times,* March 30, 1883.

AN OPENING IN THE NORTH-WEST.

St. Paul, Minn., March 31, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Will you please to make public in your "Building Intelligence" that there is a great scarcity here of good architectural draughtsmen. A dozen good draughtsmen could find plenty of employment here and in Minneapolis. Is your bureau for placing draughtsmen still in operation? Please do something in this matter.

Yours respectfully,

George Wirth.

NOTES AND CLIPPINGS.

Yankee Enterprise in Europe.— Some very singular advertisements appear from time to time in the newspapers. One of the most curious has lately been observed in a Paris paper, where a certain "Yankee Engineer" thus addresses all "whom it may concern": "Having visited the Leaning Tower of Pisa, Italy, I am fully convinced that the architectural grandeur and beauty of this ancient and colossal relic of past ages can be wonderfully improved. I hereby offer to contract to put this immense structure in a perpendicular position and raise it to a level of the ground for the sum of $600,000, the terms of payment and time of completion to be agreed upon, the time not to exceed ninety days." There is something truly American in the matter-of-fact way in which this audacious proposition is advanced. If now, as might readily happen if the idea occurred to him, some Yankee patent-medicine manufacturer should come forward and offer to defray the expenses of this gigantic work on condition that he be permitted to paint the advertisements of his particular panacea all over the outside and interior of this tower, the glory of the great American eagle would be sensibly enhanced. In fact if the Europeans were only in any degree "up to snuff" they might have all their scandalously-neglected ruins put into complete repair on similar easy terms. —*Exchange.*

Trees in Streets. — The *Building and Engineering Times* says, in reference to a controversy which has been going on in Geneva on the utility or otherwise of trees in public squares and streets: We should have thought that there could be little difference of opinion on the subject. The foliage is grateful to the pedestrian in hot weather, and it shelters him in wet weather, while the entire appearance of the street is improved by a row of green trees. An ingenious opponent of this pretty general opinion asserts that so far from the trees being healthy they are quite the reverse, inasmuch as they impede the circulation of air; and as for those individuals who prefer shade to sunshine, they have only to walk on the shady side of the street to attain their desire. Certainly, if the trees are planted without judgment, they will impede the circulation of the air; if planted in too close contiguity to each other, the effect cannot be beneficial to the general health. Nor should they be allowed to come in contact with the buildings near which they grow. There is not much chance of any of these contingencies occurring in the metropolis; rather are the trees too few and far between. A most important function is also performed by the roots of the trees in drawing up stagnant waters and absorbing organic matters in the subsoil. These are advantages not to be ignored by householders in large towns, where the drainage is very often defective.—*Pall Mall Gazette.*

Funereal Furniture. — The following story would be almost incredible if the facts had not been stated in evidence a fortnight ago before a French court: Some months ago M. Aurille, an architect, ordered of a Paris upholsterer, named Distruit, a suit of bed-room furniture for 2,500 francs. He was delighted with his bargain, until one morning his wife, while dressing, read on the back of the toilet-table "*Regrets eternels*" engraved in the marble. The effect produced upon her mind by this discovery led to further investigation of the furniture. The marble top of a chest of drawers was lifted, and on the under side M. and Mme. Aurille read: "*Bon père, bon epoux.*" All speculation was then at an end. M. Distruit had gone to a cemetery for his marble slabs. M. Aurille declared that he would have no such sepulchral memorials in his house, and asked the tradesman to take back the furniture. The latter having declined the architect refused to pay the bill. The Court held that the marble was not less marble because it had once been put to funereal uses, and ordered M. Aurille to pay the account. — *Exchange.*

Black-Listing.— Here is a practical suggestion. When a man is caught selling bad milk, the proper authorities advertise his name. Now, if a building takes fire through carelessness in the construction, let the officers of the law advertise the name of the responsible party. No injustice would be done by that. — *Boston Herald.*

The Building Inspectors of Baltimore have given orders that the doors of 59 churches in that city be made to swing outward. Nearly every church building in the city was found to have its outer doors swinging inward.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

274,465-466. SEWER-INLET. — Edward Z. Collings, Camden, N. J., and Charles F. Pike, Philadelphia, Pa.
274,481. STAPLE. — Stiles Frost, Boston, Mass.
274,484. WAX COMPOUND. — Peter C. Ghaler, York, Pa.
274,499. BOLT-CUTTER. — Jophanus H. Kennedy, New Vineyard, Me.
274,514. TILE-MACHINE. — George Potts, Indianapolis, Ind.
274,528. ELLIPSOGRAPH. — Charles W. Stickney, Washington, D. C.
274,536. WEATHER-STRIP. — Joseph Walker, Belleville, Kan.
274,544-545. WRENCH. — Frank Armstrong, Bridgeport, Conn.
274,563. STONE-TURNING LATHE. — Thomas F. Clemons, Tiverton, County of Devon, England.
274,564. LIGHTNING-CONDUCTOR. — James H. Coon, Des Moines, Io.
274,565. PLANING-MACHINE. — Allen P. Creque, New York, N. Y.
274,599. WATER-PROOF PAINT. — Elam Hays, Clear Lake, Iowa.
274,600. RABBET-PLANE. — Oliver Hegglund, Oakland, Neb.
274,606. DRAWING-TABLE. — Arnold Hormann, Hoboken, N. J.
274,628. WATER-CLOSET VALVE. — John McGuire, Milwaukee, Wis.
274,631. PIPE-CUTTER. — John Miller, Cambridgeport, Mass.
274,644. WATER-CLOSET. — Andrew G. Myers, New York, N. Y.
274,657. FIRE-ESCAPE. — Robert L. Pruyn, Baton Rouge, La.
274,668. LOCK FOR SLIDING-DOORS. — Charles S. Rees and Patrick Mills, Pueblo, Col.
274,676. HEATING-FURNACE. — Felix Tylee, Cleveland, O.
274,711. BORING-BIT. — William W. Brigg, Washington, D. C.
274,725. REVOLVING WATER-CLOSET STENCH-TRAP. — Lee D. Craig, San Francisco Cal.
274,734-735. MANUFACTURE OF PORTLAND CEMENT. — Edward J. De Smedt, Washington, D. C.
274,765. AUTOMATICALLY-OPERATING DOOR. — John L. Hawkey, Cape May, N. J.
274,770. AUTOMATIC CLUTCH FOR ELEVATORS. — Edwin T. Herrick, Providence, R. I.
274,775. FILE. — William Huger, Newark, N. J.
274,777. SELF-CLOSING HATCHWAY. — David Humphreys, Norfolk, Va.
274,785. HEATER. — Jonathan Johnson, Lowell, Mass.
274,789. PRODUCTION OF DISINFECTANTS. — Chas. T. Kingzett, 17 Lansdowne Road, Tottenham, and Maximilian Zingler, 19 Buckland Crescent, Belsize Park, County of Middlesex, England.
274,820. STEAM-RADIATOR. — David Renshaw, Braintree, Mass.
274,831. SASH-CORD GUIDE. — James Shannon, Washington, D. C.
274,838. CLAMP. — Charley Steineke, Brooklyn, N. Y.
274,844. SELF-CLOSING HATCHWAY. — Richard D. Thackston, St. Louis, Mo.
274,846. FIREPLACE. — Melchesedeck Y. Thompson, Arkadelphia, Ark.
274,868. DEVICE FOR FILLING PIPE-JOINTS. — Thomas Watkins, Johnstown, Pa.
274,876. INSERTIBLE SAW-TOOTH. — William Zerman, Trenton, N. J.
274,886. PLANING-MACHINE. — Jacob M. Cook and Jesse S. Perkins, Lake Village, N. H.
274,887. AUTOMATIC GATE FOR ELEVATORS. — Geo. V. Delue, Boston, Mass.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report thirty-six permits have been granted, the more important of which are the following: —

Fanny Carretter, three-st'y brick building, s s Chase St., w of Valley St.

Baltimore & Ohio R. R. Co., an elevator, 70' x 158', s w cor. Henrietta and Howard Sts.

Wm. S. Taylor, Jr., 2 three-st'y brick buildings, s w cor. Fayette St. and Vincent Alley, and two-st'y brick building in rear.

Geo. R. Presstman, 11 two-st'y brick buildings, s w cor. Chesapeake and Lancaster Sts.

C. G. Summers, three-st'y brick building, e s Little Sharp St., n of Baltimore St.

Henry Smith, 4 two-st'y brick buildings, e s Castle St., n of Fairmount Ave.; also 2 three-st'y brick buildings, w s Chester St., n of Fairmount Ave.; also, 8 three-st'y brick buildings, s s Montrose St., e of Gilmor St.

Solomon Frank, three-st'y and mansard brick building, e s Eutaw Pl., n of Townsend St.

John Waters, 8 two-st'y brick buildings, w s Parrish Alley, s of Mulberry St.

John F. Ehlen, three-st'y brick building, w s Jasper St., between Franklin and George Sts.

Jos. M. Cone, 9 three-st'y brick buildings, w s Calhoun St., s of Lafayette Ave.

B. F. Smith, 7 two-st'y brick buildings, e s Haubert St., n of Fort Ave.

Geo. A. Blake, 2 three-st'y brick buildings, e s Eutaw Pl., between Townsend and Mosher Sts.

Union Passenger Railway Co., two-st'y brick addition to stable, s e cor. Frederick Ave. and Smallwood St.

B. Frank Leitch, greenhouse to No. 320, w s Caroline St., between Preston and Biddle Sts.

S. Devereaux, 2 three-st'y brick buildings, e s Harford Ave., between Madison and Chew Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Marlborough St., No.* 257, Ward 11, for William Simes, dwell., 24' x 62', four-st'y pitch; Woodbury & Leighton, builders.

Newbury St., No. 113, Ward 11, for George R. Shaw, dwell., 28' x 65', four-st'y flat; Norcross Bros., builders.

Wood. — George St., near Hudson St., Ward 20, for Chas. E. Titus, dwell., 24' x 35', two-st'y pitch; F. W. Webster, builder.

West First St., No. 378, Ward 14, for Geo. W. Ball, storage, 47' x 50', one-st'y flat; Geo. W. Ball, builder.

Webster Ave., near Brighton Ave., Ward 25, for Jacob W. Berry, carpenter-shop, 22' x 34', two-st'y pitch; Jacob W. Berry, builder.

Tremont St., opposite Wigglesworth St., Ward 22, for Michael J. Shay, dwell., 25' x 35', two-st'y hip; McDonald & Tobin, builders.

East Fifth St., Nos. 520-524, Ward 14, for Lyman Locke, 3 dwells., 18' x 34' and 12' x 13', one-st'y mansard; Lyman Locke, builder.

Baldwin Pl., Ward 25, for B. F. Fiske and C. Marshall, 2 dwells., 20' x 40', two-st'y flat; Benj. Wood, builder.

Faxon St., No. 12, Ward 22, for James Devine, dwell., 20' x 34', three-st'y flat; Thomas Donahue, builder.

Private way from Washington St., near Madison St., Ward 25, dwell., 26' x 27', two-st'y pitch; Samuel N. Davenport, builder.

River-View St., rear, near Huntoon St., Ward 24, for Geo. H. Cavanagh, storehouse, 30' x 36', one-st'y pitch.

Houghton St., near Houghton Court, Ward 24, for B. F. M. Stoddard, dwell., 15' x 32', two-st'y pitch; H. P. Oakman, builder.

Train St., rear of, cor. Boutwell St., Ward 24, for M. M. Saunders, stable, 30' x 40', two-st'y mansard; Wm. A. Blazo, builder.

Crescent Ave. extension, near Cambridge St., Ward 14, for Otis S. M. Haskell, stable, 20' x 22', and 20' x 20', two-st'y flat; Spence, builder.

Smith St., No. 105, Ward 22, for James Daley, dwell., 23' x 35', three-st'y hip; Samuel Rantin, builder.

Maverick St., No. 382, Ward 2, for John J. Corrigan, boat-house, 30' x 52'; John J. Corrigan, builder.

Spring St., cor. Baker St., Ward 23, for Vine Rock Association, lodge-room, hall, and stores, 30' x 60', two-st'y pitch; W. S. Mitchell, builder.

East Broadway, No. 670, Ward 14, for Lucy M. Leighton, dwell. and store, 17' x 50', one-st'y flat; Lyman Locke, builder.

Brooklyn.

BUILDING PERMITS. — *North Elliott Pl.*, 430' n Auburn Pl., two-st'y brick school-house, tin roof; cost, $20,000; owner, Board of Education; architect, J. W. Naughton; builders, J. D. Anderson and F. G. Turner.

Fourth Pl., n s, 150' e Henry St., 3 two-st'y brownstone front dwells., tin roofs; cost, each, $4,000; owner, Alfred Williams, 39 Fourth Pl.; builders, —— Rountree and L. Bossert.

Madison St., Nos. 251 *to* 257, n s, 350' e Nostrand Ave., 4 two-st'y brownstone front dwells., tin roofs; cost, each, $3,500; owner, architect and builder, T. W. Swimm, 389 Putnam Ave.; mason, P. Costello.

Quincy St., n s, 200' w Tompkins Ave., 4 two-st'y brick dwells., tin roofs; cost, each, $4,500; owner, Paul C. Grening, 420 Gates Ave.

Beaver St., n w cor. Park St., three-st'y frame tenement, tin roof; cost, $4,000; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, T. Engelhardt.

Flushing Ave., No. 694, s s, 125' w Throop Ave., three-st'y frame double tenements, tin roofs; cost, $4,500; owner, Peter Stebe, 13 Whipple St.; architect, T. Engelhardt; masons, W. Rauth and J. Rueger.

South Fourth St., n s, 95' w Tenth St., 2 four-st'y brick tenements, tin roofs; cost, each, $10,000; owner, Alexander Wake, 427 Pleasant Ave., N. Y.; builder, Jas. Gault.

Ten Eyck St., n s, about 200' e Ewen St., three-st'y frame double tenement, tin roof; cost, $4,500; owner, Anton Schuster, on premises; architect, E. F. Gaylor; builders, J. McQuaid and Jenkins & Gillies.

Diamond St., w s, about 150' s Norman Ave., 2 three-st'y frame double tenements, gravel roofs; cost, each, $3,500; owner, Owen Galagher, Newel St.; architect, F. Weber; builders, McHugh Bros. and Randall & Miller.

Broome St., No. 46, s s, 50' w Humboldt St., three-st'y frame dwell., tin roof; cost, $5,500; owner, Hermann Hell, New York City; architect, F. Weber; builders, I. Reed and A. Lange.

Degraw St., No. 340, s s, 207' w Smith St., three-st'y brick dwell., tin roof; cost, $3,500; owner, architect and builder, N. M. Whipple, 346 Degraw St.

Eighth St., s s, 247' 10" w Seventh Ave., 4 two-st'y brick dwells., tin roofs; cost, each, $4,500; owners, E. M. Baker and S. H. Bortsly, Tenth St., near Sixth Ave.; architect and builder, T. Corrigan; mason, W. Corrigan.

Grand St., n s, 25' e Seventh Ave., three-st'y brick store and dwell., tin roof; cost, $6,500; owner and builder, Jas. Winham, 28 Bedford Ave., architect, E. F. Gaylor; mason, J. Bisson.

St. Marks Ave., n e cor. Carlton Ave., 3 three-st'y brownstone front dwells., tin roofs; cost, each, $9,000; owner and builder, John Monas, 92 Park Pl.; architect and carpenter, J. J. Gilligan.

Fifth St., n s, 290 w Seventh Ave., 12 two-st'y brick dwells., tin roofs, frame and tin cornice; cost, each, $3,500; owner and mason, Charles Long, 383 Eleventh St.; carpenter, J. F. Wood.

Fifth St., n s, 24' w Seventh Ave., 6 three-st'y brownstone front dwells., tin roofs, frame and tin cornice; cost, each, $4,500; owner and mason, Chas. Long, 383 Eleventh St.; carpenter, J. F. Wood.

Luqueer St., n s, 165' w Court St., 2 three-st'y brick tenements, tin roof; cost, $3,500; owner, architect and builder, Thos. Keogh, 151 Nelson St.

ALTERATIONS. — *Sand St.*, n w cor. Adams St., raised one-st'y, tin roof, iron girders furnished for basement wall; cost, $6,000; owner, Hugh Larkin, cor. Jay and Prospect Sts.; architect, J. F. Thomas; builders, P. J. Carlin and Long & Barnes.

Franklin Ave., No. 482, two-st'y brick extension, tin roof; cost, $4,500; owner, D. M. Stone, on premises; architect, A. Hill; builder, B. Linkin.

Chicago.

FACTORY. — Plans were prepared by Treat & Folz for the large factory now building by the Western Electric Manufacturing Co., at the corner of Clinton and Van Buren Sts.; it will be five stories, 150' x 250', and cost $115,000.

STRIKE. — Between four thousand and five thousand bricklayers in Chicago went on a strike, April 2, for $4 per day. The work on all the principal buildings is stopped.

BUILDING PERMITS. — John Cramer, two-st'y brick store and dwell., 22' x 55', 715 Indiana St.; cost, $3,500.

Chas. Dagling, three-st'y brick flats, 27' x 72', 383 La Salle Ave., to cost $14,000.

O. M. Sheldon, 2 two-story brick dwells., 43' x 41', 48 and 50 Douglass Ave., cost, $8,000.

J. A. Roabe, two-story brick flats, 25' x 76', 3824 State St., cost, $5,500.

L. W. Pitcher, two-st'y brick dwell., 26' x 68', 2725 Prairie Ave., cost, $9,000.

Fred Meurer, two-st'y brick dwell., 403 Hurlbut St., cost, $5,500.

M. Helzel, two-st'y brick flats, 21' x 58', 356, W. Thirteenth St., cost. $4,000.

J. Byson, three-st'y brick dwell., 21' x 50', 131 Nineteenth St., cost, $4,000.

C. W. Turner, three-st'y brick dwell., 22' x 50', 102 Centre Ave., cost, $5,500.

Wm. Dickenson, 4 three-st'y and basement brick dwells., 64' x 100', 600 to 608 Division St.; cost, $60,000.

Phillips & Johnson, 2 three-st'y and basement brick dwells., 48' x 54', 250 to 252 Wells St.; cost, $9,000.

E. Fontaine, three-st'y and basement brick dwell., 17' x 66', 42 Bellevue Place; cost, $3,000.

Rudolph Bielfeld, three-st'y brick flats, 21' x 60', 827 Twelfth St.; cost, $5,000.

Ch. Farr, 5 brick cottages, 36' x 100'; Thirty-first St.; cost, $5,000.

R. Dannfreo, two-st'y and basement brick flats, 18' x 48'; cost, $3,000.

New York.

BANK BUILDING. — Messrs. Robert H. Robertson and Jos. H. Lord are to submit competitive plans for the bank-building 40 and 42 Wall St., in addition to the architects previously named.

HALL. — Messrs. Hyde & Behman have purchased the property on the n w cor. of Broadway and Thirty-fifth St., and propose to erect a minstrel hall and flats, to be ready September 1.

THEATRE. — Joseph Hart is negotiating for the purchase of the site of the Park Theatre, at Broadway and Twenty-second St. If successful, Mr. Hart will build a theatre to hold 2,500 persons, and furnish it with a double stage, at a cost of $350,000.

BUILDING PERMITS. — *Eightieth St.*, s s, 124' e Madison Ave., 7 four-st'y brownstone front dwells., tin roofs; cost, each, $26,000; owner, Terence Farley, 165 East Sixty-first St.; architects, Thom & Wilson.

Seventy-ninth St., s s, 350' w Ninth Ave., 5 three and four st'y brownstone front dwells., tin roofs; cost, each, $10,000; owner, Samuel Colcord, 400 West Seventy-ninth St.; architect, W. L. Harris.

Ninety-fifth St., n s, 80' w Third Ave., five-st'y brownstone front tenement and store, tin roof; cost, $14,000; owner and builder, John D. Karst, Jr., 2006 Second Ave.; architect, Wm. Graul.

West Thirty-eighth St., Nos. 550 *and* 552, five-st'y brick factory, gravel roof; cost, $16,000; owner, Mary Cable, 417 West Thirtieth St.; architect, Robert Cable; builders, O. Perrine and John L. Hamilton.

ALTERATIONS. — *East Thirty-second St., No.* 7, a handsome brownstone residence is to be altered and additions made, at an expense of $15,000, for a co-operative apartment-house company. The present building is 25' x 60', four-st'y and basement; Messrs. D. & J. Jardine will be the architects.

Philadelphia.

STRIKE. — The house-painters, having demanded an advance from $2.50 to $3.00 per day and been refused, are now on a strike, with a fair prospect of securing the demanded advance.

BUILDING PERMITS. — *Chelten Ave.*, n s, w of Main St., 2 three-st'y stores and dwells., 18' x 50'; Tourison Bros., contractors.

Chelten Ave., s s, e of Hancock St., three-st'y dwell. and two-st'y stable, 20' x 60' and 20' x 30'; Tourison Bros., contractors.

Snyder Ave., n s, w of Sixth St., two-st'y dwell., 16' x 42'; Crosby Sellick, owner.

Park Ave., w s, n of Oxford St., 7 three-st'y dwells., 15' x 58'; J. L. Carre, owner.

Ripka St., n e cor. Mansion St., 3 three st'y dwells., 18' x 30'; Jno. Bannon, owner.

Broad St., e s, n of Ellsworth St., two-st'y store and dwell., 21' x 37'; Jno. McConaghy, contractor.

Sixth St., n w cor. Norris St., 7 three st'y dwells., 15' x 42'; A. M. Zane, owner.

North Second St., No. 554, four-st'y addition to store, 16' x 32'; Thos. McCarty, contractor.

McCalpin St., e s, s of Walnut St., two-st'y dwell., 16' x 44'; L. W. Goodman, contractor.

Thirty-first St., cor. Jefferson St., n w s, fifth-st'y addition to brewery, 46' x 58'; F. A. Poth, owner.

Market St., No. 4231, two-st'y dwell., 18' x 43'; Wm. Bunch, Jr., contractor.

Master St., n s, between Twenty-fourth and Twenty-fifth Sts., 20 two-st'y dwells., 17' x 39'; J. M. Sharp, owner.

Bids and Contracts.

TOLEDO, O.—Bids have been received for cut-stone for the Toledo Custom-House. Albert Newkom was the lowest bidder, at $58,900 for buff Amherst sandstone.

MEMPHIS, TENN.—Bids were also opened for slating the Custom-House. The lowest bid was that of Knisely & Miller, of Chicago.

ST. LOUIS, MO.—Davidson & Son, of Milwaukee, have been awarded the contract for the marble-work for the Government building, at $8,290.

WASHINGTON, D. C.—The following bids for furnishing about seventy tons of rolled wrought-iron bars, 41, 16 and 1 foot long, for ties and anchors for walls of New Pension Office, have been received.

No.	Bidders.	Residence.	Place of Delivery.	Price per pound. 41 ft. Bars. Cents.	16 ft. Bars. Cents.	1 ft. Anchors. Cents.	Remarks. Tensile strength.
1	J. F. Bailey.	Philadelphia.	Washington.	2.3 / 2.5	2.3 / 2.5	2.3 / 2.5	45,000 / 48,000 lbs. per sq. in.
2	Albany & Rens. Steel & Iron Co.	Troy, N. Y.	N. Y. City.	2.9	2.9	2.9	49,280 " "
3	Jas. Rowland & Co.	Phila.	Washington.	2.8	2.7	2.7	" " "
4	Allentown Rolling Mills.	"	"	2.5	2.5	2.5	" " "
5	Tredegar Iron Works.	Richmond, Va.	"	2.75	2.75	2.75	" " "
6	Phœnix Iron Co.	Phila.	"	2.7	2.7	2.7	" " "
7	Morris Wheeler & Co.	"	"	2.75	2.75	2.75	" " "
8	Pencoyd Iron Works.	"	"	2.73	2.73	2.73	" " "
9	N. J. Steel & Iron Co.	Trenton, N. J.	"	2⅜	2⅜	2⅜	" " "
10	Jas. McGill.	Washington.	"	2.37	2.37	2.37	" " "
11	C. A. Schneider's Sons.	"	"	2.45	2.45	2.45	" " "
12	J. B. Kendall.	"	"	2.39	2.39	2.39	" " "

General Notes.

ALBANY, N. Y.—A brownstone church is to be built for the First Presbyterian Church at a cost of about $80,000. It is to be in the Lombard style of architecture from designs of Messrs. J. C. Cady & Co., of N. Y.

BURLINGTON, VT.—Hon. Frederick Billings of Woodstock has given the University of Vermont $75,000 for the erection of a library building.

DAYTON, O.—The Dayton Electric Light Company will erect a building, 50′ x 100′, at once.

Benjamin Kuhns will build a block of brick and stone stores, at the corner of Fourth and Main Sts.

W. P. Callahan will build a four-st'y brick block on North Main St.

DERRY, N. H.—A Baptist Church is to be built at Derry Depot.

ROCHESTER, N.Y.—The architects are busily engaged in finishing the plans and designs for a new building to be erected by the firm of Alling & Corry on Exchange St., next to the canal.

COMPETITION.

AMERICAN ARCHITECT COMPETITION.

MECHANICS' HOUSES.

I. Our last competition provided for the wants of a man whose income was about five dollars per diem; in the present one we would like to have the competitors turn their attention to a house for a mechanic living on a daily wage of three dollars, who can afford to build only by joining a "building association," or by mortgaging his proposed house, and who, even under such circumstances, ought not to attempt to build a house costing more than $1,500. As it may be fair to suppose that this mechanic and his family are more hardy than more fortunate individuals who enjoy a larger income, he might elect to build, for perpetual occupancy, such a house as the more wealthy would build only for summer use.

The chief essentials in designing such a house are space, good construction, and a careful regard of the limit of expense. The conditions of the present competition are simply that the proposed house shall contain at least six rooms, and shall approximate in cost $1.500. Open fireplaces, bath-rooms, water-closets, furnaces, etc., are to be held as luxuries and not essentials.

Required. A pen-and-ink drawing containing a perspective view of the exterior, plans of both floors and an elevation of one of the sides not shown in the perspective; also as many details as possible. The drawing may measure 14″ x 22″ or 21″ x 33″, to suit the convenience of the designer.

Also, a short reading description, [not a specification] explaining what steps have been taken to keep the cost within the prescribed limit, and a detailed bill of quantities and prices carefully arranged and classified [a great improvement in this respect can be made over many of the schedules furnished in the former competition]. Each competitor is required to obtain an estimate on his design from a trustworthy builder, and furnish the name and address of such builder for publication with the estimate.

For each of the three designs of highest merit a prize of $50 will be paid. No design will be published in the "*American Architect*" previous to the award of the jury, in order that each competitor may have the benefit of the publication of his name and address with his design if he so desires.

Drawings are to be received at the office of the *American Architect*, 211 Tremont Street, Boston, on or before Saturday, April 21.

II. It is possible that two mechanics would perceive the possibility of securing a more commodious habitation by clubbing their purses, and building a double tenement under a common roof. In such a case each tenement might be treated as a distinct dwelling, or it would be fair to suppose that the two mechanics were brothers or intimate friends whose families could live in harmony, and could make use of certain rooms and conveniences in common, as for instance the kitchen, the dining-room, or a larger parlor in addition to the usual living-rooms of each house. Any competitor who attempts to work out this phase of the problem must take care to keep the privacy of the two dwellings in all other respects well marked. Building thus under one roof, and on a common foundation, each mechanic might expect to obtain a larger dwelling, having at least seven rooms, without materially increasing their combined expenditure, which the competitors must try and keep within $3,000.

Required. A pen-and-ink drawing 22″ x 30″ containing a perspective view; plans of both floors, and an elevation of one side not shown in the view; framing plans at a small scale and all necessary details.

Also, a short skeleton specification, a detailed bill of quantities and prices, and a tender from some reputable builder, name and address being furnished for publication.

For the best designs in the order of their excellence will be awarded prizes of $100, $75 and $50 respectively.

Drawings must be received at the office of the *American Architect* on or before Saturday, May 19, next.

PROPOSALS.

PROPOSALS FOR BUILDING A STEAM VESSEL FOR THE U. S. COAST AND GEODETIC SURVEY.

U. S. COAST AND GEODETIC SURVEY OFFICE,
WASHINGTON, D. C., March 15, 1883.

Sealed proposals, in duplicate, will be received at this office **until 12 M., on June 1st., 1883**, and opened immediately thereafter, for building a wooden steam vessel for this service.

The approximate dimensions are one hundred and seventy-four feet length, twenty-seven feet nine inches breadth (extreme), eleven feet five inches depth; displacement, seven hundred and eighteen tons.

Blank forms on which proposals must be made, specifications and any necessary information can be obtained on application to the Hydrographic Inspector of the Survey at this office.

380 J. E. HILGARD, Supt.

STEAM-HEATING APPARATUS.
[At Topeka, Kansas.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., April 2, 1883.

Sealed proposals will be received at this office **until 12 M., on the 24th day of April, 1883**, for supplying and fixing in place complete, a low-pressure return-circulation steam-heating apparatus in the Court-House and Post-Office Building at Topeka, Kansas, in accordance with drawings and specification, copies of which and any additional information may be had on application at this office, or the office of the Superintendent.

JAS. G. HILL,
380 Supervising Architect.

RIP-RAP.

U. S. ENGINEER OFFICE,
NEW LONDON, CONN., March 27, 1883.

Sealed proposals in triplicate will be received at this office **until 11 o'clock A. M., on the 24th day of April, 1883**, for rip-rap granite, to be delivered in breakwater at

Clinton Harbor, Conn.,
Greenport Harbor, New York,
Port Jefferson Harbor, New York.

Specifications and blank forms for proposals and for guaranty will be sent on application to this office.

J. W. BARLOW,
382 Major of Engineers, U. S. A.

SEWER.
[At Buffalo, N. Y.]
March 24, 1883.

Sealed proposals will be received by the Board of Sewer Commissioners of the city of Buffalo, N. Y., at their office No. 31 City and County Hall, in said city, **until Friday, April 13, 1883, at 3.30 P. M.**, for the construction of Section "C" of the Buffalo Trunk Sewer, in accordance with plans and specifications on file in said office.

Each proposal must be accompanied with a bond in a penalty of 25 per cent of the bid executed by two sureties residing in the State of New York, conditioned that the successful bidder will execute the contract and give security therefor as required by the specifications.

D. C. BEARD,
38[illegible] Chairman Board Sewer Commissioners.

PROPOSALS.

LOCKS.
[Near LaGrange, Ill.]

UNITED STATES ENGINEER OFFICE,
25 HONORE BUILDING,
CHICAGO, ILL., March 20, 1883.

Sealed proposals in triplicate will be received at this office **until 12 o'clock, noon, Saturday, April 21, 1883**, for furnishing stone for the construction of two (2) locks on the Illinois River, near LaGrange and Kampsville, Ill.

For specifications, blanks for proposals, and all information, apply at this office.

W. H. H. BENYAURD,
381 Major of Engineers.

FURNITURE.
[At Albany, N. Y.]

OFFICE OF THE SECRETARY,
TREASURY DEPARTMENT,
WASHINGTON, D. C., March 17, 1883.

Sealed proposals will be received at this office **until 1 o'clock, P. M., of Saturday, March 31, 1883**, for manufacturing, delivering, and placing in position, in complete working order, certain furniture for the United States custom-house, court-house and post-office at Albany, N. Y.

Upon application to this office, detailed information will be furnished to furniture manufacturers desiring to submit proposals.

The Department reserves the right to reject any or all bids, or parts of any bid, and to waive defects.

380 W. F. FRENCH, Acting Secretary.

SEWERS.
[At Waterbury, Conn.]
March 17, 1883.

Sealed proposals for the construction of about two miles of brick and pipe sewers in the city of Waterbury, Conn., will be received by the Board of Sewer Commissioners **until 2 P. M. of Thursday, April 12, 1883**, at which time they will be publicly opened and read.

Bids are to be made on the forms furnished by the Commissioners and accompanied by the proper bond.

Forms of proposal and specifications may be obtained and plans seen at the office of the City Engineer, Baldwin's Block, Bank Street, on and after Monday, March 26. The Board reserves the right to reject any and all bids.

By order of the Board of Sewer Commissioners.

380 N. J. WELTON, C. E.

POST-OFFICE.
[At Port Hope, Ont.]

DEPARTMENT OF PUBLIC WORKS,
OTTAWA, March, 1883.

Sealed tenders, addressed to the undersigned, and endorsed "Tender for Post-Office, etc., Port Hope, Ont.," will be received at this office **until Tuesday, the 10th day of April next, inclusively**, for the erection of a post-office at Port Hope, Ont.

Plans and specifications can be seen at the Department of Public Works, Ottawa, and at the custom-house, Port Hope, on and after Thursday, the 22d inst.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures.

Each tender must be accompanied by an accepted bank check, made payable to the order of the Honorable the Minister of Public Works, equal to five per cent of the amount of the tender, which will be forfeited if the party decline to enter into a contract when called upon to do so, or if he fail to complete the work contracted for. If the tender be not accepted, the check will be returned.

The Department does not bind itself to accept the lowest or any tender.

By order. F. H. ENNIS,
380 Secretary.

LIFE-SAVING STATION.
[At Barnegat City, N. J.]

TREASURY DEPARTMENT, OFFICE OF GENERAL
SUPERINTENDENT, U. S. LIFE-SAVING SERVICE,
WASHINGTON, D. C., March 30, 1883.

Sealed proposals will be received at this office **until 12 o'clock, noon, of Wednesday the 18th day of April, 1883**, for the construction of a life-saving station at Barnegat City (south side of Barnegat Inlet), on the coast of New Jersey.

Bidders will state in their proposals the time within which they will agree to have the building completed ready for occupancy.

Each bid must be accompanied by a bond in the sum of five hundred dollars with two good and sufficient sureties conditioned that the bidder shall enter into contract without delay, and give such bonds as security for the faithful performance thereof as may be required, if his bid be accepted, or by a deposit of five hundred dollars U. S. currency or bonds to be returned to the unsuccessful bidder after the award of the contract, and to the successful bidder after his contract and bonds for the faithful performance of the terms thereof shall be approved by the Secretary of the Treasury. Specifications and plans, forms of proposal, contract and bonds, can be obtained at the offices of the Collector of Customs at Philadelphia, Pa.; J. G. W. Havens, Superintendent Fourth Life-Saving District, Metedeconk, N. J.; Captains G. R. Slicer and J. H. Merryman, U. S. R. M. Superintendents of Construction of Life-saving Stations, No. 3 Bowling Green, New York City; J. H. Ridgway, Keeper Life-Saving Station No. 17, Fourth District, Barnegat, N. J. and also upon application to this office.

All proposals must be endorsed "Proposals for the construction of a Life-Saving Station," and addressed to the General Superintendent, Life-Saving Service, Washington, D. C.

The right to reject any or all bids or to waive defects, if deemed for the interest of the Government, is reserved.

T. I. KIMBALL,
381 General Superintendent.

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THE clause in the new tariff act which imposes a duty of thirty per cent on all works of art imported into the United States, exempting only those by American artists, is causing a good deal of mortification among respectable painters and sculptors in this country, who do not relish the public manner in which the act proclaims that an enormous penalty is necessary to frighten the public into buying their pictures or statues. Those whom the law seems particularly intended to benefit, the American artists residing abroad, are the loudest of all in their disavowal of any desire to see their foreign competitors for the favor of American amateurs handicapped by such a discrimination, and a committee has already been formed in Paris, including such noted painters as Healy, Bridgman, Sargent, Knight and Pearce, to promote a repeal of the duty at the earliest possible moment. The better class of artists in New York second the movement, and petitions for repeal will come before the next Congress from all quarters. The rejection of the petition against the increase of the duty, which was presented last autumn, is ascribed to the unfortunate circumstance that a number of rich men signed it, and the opportunity for snubbing that class visibly, in order to gain votes among the poor and envious, was too good to be lost.

AN offer has been made by Mr. Edison to Columbia College, to present to the college the collection of electrical instruments exhibited at Paris last year, on condition that the college shall establish a school of electrical engineering. The offer is under consideration, but the cost of maintaining such a school will be considerable, and the trustees wisely refrain from making any promises without knowing whether they will be able to fulfil them. Meanwhile Mr. Edison himself has resolved to begin the systematic instruction of electrical engineers in a school to be established in his own manufactory in Goerck St., New York. The extent of the business done by the Edison Company is now so great that competent men cannot be found to take charge of the work, and a practical training-school under such auspices, like the railway engineering school established by the Pennsylvania Railroad, ought to be very successful and useful. An electrical department at Columbia, however, if established, will not be the first of the kind in the country. The authorities of the Massachusetts Institute of Technology made the necessary provision for such a course a year ago, and will soon be ready to graduate its first class; while similar departments have been established at Tufts College, and, if we are not mistaken, at Cornell University.

A CASE of some importance was tried in the New York Courts recently, in which Dr. Green, the owner of real estate at the corner of Hudson and Laight Streets, in New York City, brought suit to recover damages from the New York Central and Hudson River Railroad Company, for unlawful conversion of St. John's Park, which was situated near his property, into a site for an enormous freight station; and for injury to his comfort by running trains to and fro through the street in front of his house. In regard to his rights in the park, it was decided early in the trial that as his house was situated at some distance from what was, moreover, expressly laid out from the first as a private park, for the benefit of the tenants of the land fronting upon it, but for no one else, the doctor was not entitled to damages for the loss of rights in the park which he never possessed. The railroad, however, in the judge's opinion, although a certain amount of noise and smoke accompanied its operations, did not, so long as it was managed with reasonable care, abridge or destroy those rights of light, air and passage which were all that he could claim in the street, and the question to be decided by the jury was simply whether the company had conducted its road with proper care, and if not, how much Dr. Green had been injured by its fault. After several hours' deliberation, a verdict was brought in in favor of the plaintiff, awarding him six cents damages.

A CORRESPONDENT of *La Semaine des Constructeurs* has been making some experiments upon the effect of steam in extinguishing fires, and publishes a few of the results of his experience. Wishing to ascertain what proportion of steam in the atmosphere of a room would be most effective for this purpose, he placed thermometers in different parts of his experimental enclosure, in order to measure the temperatures, and with them the volumes of the various portions of the mixture. This test, although it failed of its special purpose, the thermometers marking temperatures so varied as to give no indication of the tension of the whole mass, developed some important facts of another kind. It was found that for the best effect the steam should be maintained in the burning room at a pressure slightly greater than that of the atmosphere, in order to prevent fresh air from pressing in from the outside, as well as to drive out slowly the air already in the room; and many trials showed also that the steam forced in should be "wet," containing a large admixture of condensed vapor. Dry steam was proved to have little or no effect in extinguishing the flames, and under any circumstances, probably on account of the more rapid condensation, the colder the room in which the experiment was made, the more prompt and certain was the action.

THE Brooklyn Suspension Bridge is rapidly approaching completion, and in a month or two more it will probably be open, at least to pedestrians. The planking of the footways is nearly half done, and that of the carriage-roads is well advanced. The metal-work is mostly in place, and is in process of painting. The approaches on either side are being cleared, and it is already easy to cross the river on foot. The next problem to be solved is that of the commercial value of the bridge. Whether a very large number of persons will in summer prefer climbing the long ascent to the roadway, in place of crossing the river by ferry, is perhaps doubtful, but the security which the bridge will afford in winter against the fog blockades, which are not unusual on the East River, is of considerable value.

THE Mississippi River Commission has been studying the probability of a diversion of the river current from its present course to the shorter channel of the Atchafalaya. An artificial cutting, taking this route, has been spoken of as a relief outlet for the spring inundations, but it seems that the erratic Mississippi is not unlikely to undertake this piece of engineering on its own account. In the opinion of Captain Eads, then a member of the Commission, who is, of course, very familiar with the movements of the river, such a diversion of the channel would be very unfortunate for the city of New Orleans, which would thus, he thinks, be left upon the bank of a stagnant lagoon; and he proposed that a wall should at once be built across the Atchafalaya, at the point where it leaves the Mississippi, which would effectually divide it from the channel of the larger stream. A survey of the region has been made for the Commission, but its results did not seem to indicate any immediate risk of a radical change in the current, and it was decided to do nothing at present but place temporary obstructions in the water.

THE Italians are fond of dwelling on the past greatness of themselves and others, and like to commemorate noble deeds. One of the last instances in which this fancy was indulged has a particular interest for Americans, the personage whose memory was honored being one of their compatriots, Professor Samuel F. B. Morse, the inventor of the electric telegraph. From February, 1825, to January, 1826, Morse, then an artist of some distinction, is said to have inhabited a house in Rome, No. 17, Via dei Prefetti, and although the telegraph was not thought of until ten years later, the Roman municipality decided recently that it was advisable to distinguish the dwelling of the future inventor by a commemorative tablet, which has just been completed and inaugurated with much ceremony. Although Professor Morse derived little pecuniary benefit from his great discovery, his merit has at least been universally recognized, both at home and abroad. Probably no American ever received so many medals and foreign decorations, and the new honor done his memory by the city of Rome gives pleasant evidence that the civilized world has not yet lost its sense of gratitude to him.

M. PHILIPPART, the principal manager of the Société Force et Lumière, which made so much stir on the other side of the water a year or so ago by its audacity in advertising itself and the storage batteries in which it was interested at the expense of various learned societies and individuals, has, we regret to learn, been pursued by minions of the law from Belgium, where, while living in prudent exile from his native land, he seems to have occupied himself in rehearsing those arts of finance for which he had already become famous, and he is now in custody in Paris, awaiting extradition. There is nothing more singular than the way in which every discovery or invention, of a character to awaken popular interest, is seized upon by unscrupulous speculators as a means for hoisting themselves into notoriety at the expense of small investors who, attracted by the grain of truth contained in the prospectuses issued to delude them, and unable to weigh correctly the value of other circumstances, fall an easy prey to ingenious mendacity. Fortunately for the stockholders of the Force et Lumière Society, the character of Philippart was so bad from the first that no one of ordinary prudence would entrust much money to his care, and the shares had for some time possessed little more than a nominal value. Even among the honest corporations formed to carry on business relating to electric light and power, very few have prospered within the last year or so, and most of the capital invested in them brings in no profit.

IT seems that the counterfeiting of antiquities is a business not confined to the old world, and collectors of American curiosities will do well to look out that they are not deceived in the same manner as their friends who bring home gigantic scarabæi from Egypt, or historical relics from Paris and London. According to Professor Putnam, of the Peabody Museum of Ethnology, there are regular manufactories of mound-builders' pottery, stone weapons, and other archæological objects in Philadelphia, as well as in various parts of the West. Some of the counterfeits are so well executed as to find their way into the cabinets of experts, but many others are so obviously fraudulent that nothing but the extreme credulity of the average American would give them any currency. Professor Putnam mentions an instance of a carved stone figure of a child, which was said to have been found, partly covered with cement, at Hot Springs, Arkansas, and was impudently sent to the Peabody Museum with what purported to be proofs of its authenticity. Unfortunately for the success of the fraud, the intelligence of the Director of the Museum proved to be quite equal to that of the persons who hoped to deceive him, and the infant was promptly returned. This abortive attempt to deceive a scientific man was probably inspired by the success among the vulgar of the "Cardiff giant" imposition, some fifteen years ago. In this case a rude stone figure, said to have been found in the bed of a stream, was exhibited about the country to wondering crowds, and even gained the honor of being noticed by some persons of reputation. The singular feature of this exhibition was that it took place simultaneously in many different places, and the manufacture of "Cardiff giants" was carried on, while the interest lasted, without disguise.

A SEVERE check is said to be threatened to a certain class of building operations in Paris, where work of the kind has been unusually active for a year past. The advance in rents of two or three years ago, with the opening of the new quarter beyond the Arc de Triomphe, led to enterprises of construction on an immense scale, undertaken by incorporated associations of builders, no one of whom would have been able alone to assume the necessary responsibility. These associations soon became very numerous, and a correspondent of *La Semaine des Constructeurs* estimates that two-fifths of all the buildings now in process of construction in Paris belong to them. The money for the operations of the building societies is furnished by what we should call mortgage-security companies, composed of capitalists who contract to advance as required sixty per cent of the value of the completed buildings, the remaining forty per cent being made up partly by the profit of the construction company, and partly by its own outlay in labor and cash. So long as the demand continued good, the profits were large, sales were quick, so that the mortgage interest was soon extinguished, and the burden upon the speculative builders was comparatively light; but the market is now supplied for the present, and while expenses and interest continue just the same, the profit to the builder has disappeared, and houses of the kind can be sold only with difficulty, and generally at a loss. Of course, the loan companies wish to protect themselves, and refuse to run the risk of making any advances without ample security; and as this cannot be obtained, the work on such structures has generally ceased. In good locations, the well-planned houses may still be salable, but very many have been constructed in almost inaccessible quarters, far out of town, where they will not be needed for years, and the speculative proprietors of these will undoubtedly suffer serious reverses.

A CONTRACT is said to have been entered into between the Panama Canal Company and Lorestin Spalding, of Lockport, N. Y., for the construction of seven miles of the great canal, beginning at the Panama end, for the sum of seven million dollars; and negotiations are in progress for adding three miles additional to the contract, for about three million dollars more. This is probably the largest contract ever entered into in this country, if not in any. Mr. Spalding is president of a company in Lockport which manufactures dredges and excavating machines, and is already engaged day and night in filling orders from the Canal Company; so that he has had a good opportunity for learning the character of the work to be done, and estimating the effectiveness of the appliances available for doing it.

THE *Builder* gives some additional particulars in regard to the great competition for the monument to King Victor Emmanuel, which closes on the fifteenth of next December. The monument is to be placed on the ground now occupied by the Franciscan monastery of the Observantine Friars, on the northern brow of the Capitoline Hill, at the same line with the Church of Santa Maria in Aracœli, and just opposite the axis of the Corso, which will extend from the Piazza del Popolo about a mile in a straight line, to the very base of the monument. The statue of the king, which is to be an equestrian figure in bronze, is to have an architectural background, consisting of a portico, loggia, or other composition, which must be about thirty metres in breadth, and twenty-five or more in height, so as to conceal the buildings beyond. The flight of steps leading from the termination of the Corso up to the foot of the monument will be twenty-seven metres high, so that the statue will be framed, so to speak, in a vast architectural elevation about one hundred feet in width and a hundred and seventy in height. The design must be shown by a model of the statue, to be eight-tenths of a metre in height, exclusive of the pedestal, and by drawings of the architectural composition, to be made at one two-hundredth the full size for the plan, and one one-hundredth for the elevation, with details at one-fortieth. If the *Builder* gives the required scale correctly, the representation of the architectural portion is intended to be a mere sketch, since the plan, at such a scale, of the specified portico would be less than six inches long, and the elevation only about eleven and one-half inches. The real monument is probably intended to be the statue, which, with such surroundings, needs to be of colossal size. The limit of cost has been somewhat extended, and eighteen hundred thousand dollars is now allowed for the whole work, including the sculptures or decoration of the background. The authors of the best design for the architectural part, and of the best model for the statue, will be charged with the execution of their work.

WATER-CLOSETS. — VIII.

In 1868 Jennings received patents for an improvement on valves for closets of this class. A vulcanized India-rubber band was properly stretched in a groove or slot which was made in the valve for this purpose. In a fitting attached to the receiver was another vulcanized-rubber ring of the same diameter as the one in the valve, the bottom of the last rubber ring being V-shaped. When these two rings come in contact, as they would do when the valve is closed, in a valve of this kind, the joint would remain water-tight, even in case a small foreign

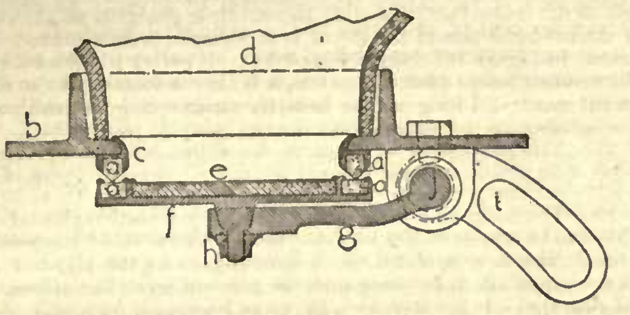

Fig. 78. — Section. — Jennings's Valve. — Details.

aa, Vulcanized-rubber rings. b, Top of receiver. c, Collar, or fitting for rubber ring. d, Bowl. e, Porcelain face. f, Metal back. g, Arm. h, Nut. i, Slotted crank. j, Spindle.

body should come between the points of contact with its seat. The efficacy of this joint and many others described depends upon the durability of vulcanized rubber. This valve combines the best points of all the valves belonging to the useful closets of this class. It will be seen by reference to the different closets described herein, that in the practicable closets the valve either has a rubber disc or ring around its circumference, or has a seat against a rubber ring, while this closet has the ring in both places, one being a portion of the valve, and another forming the valve-seat.

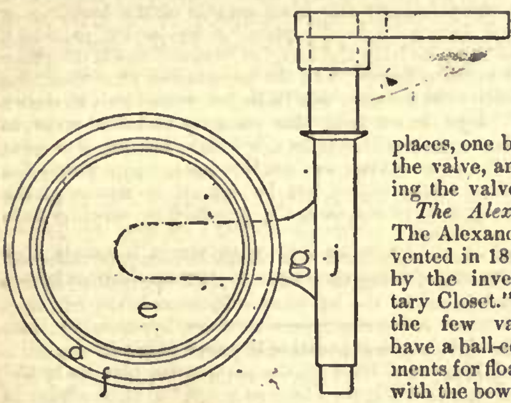

Fig. 79. — Top view. — Jennings's Valve.

The Alexander Closet. — The Alexander closet was invented in 1880, and is called by the inventor the "Sanitary Closet." This is one of the few valve-closets that have a ball-cock and compartments for floating it connected with the bowl. In 1835 John Odys combined a float supply-valve-chamber with a valve-closet. The patentee of the Alexander closet claims that "there is no possibility of the float being fouled; the bottom of bowl and lower valve being thoroughly washed each time by a flush from tank" (ball-cock chamber). The top of the valve, which is porcelain, can be taken off, and a new washer placed on without disconnecting the closet. There is a connection between the supply-chamber and valve-seat, the flowing of water through which is supposed to prevent paper, etc., from lodging either on the valve or its seat. The rock-shaft or spindle has a stuffing-box to trunk to prevent an escape of gases generated in the re-

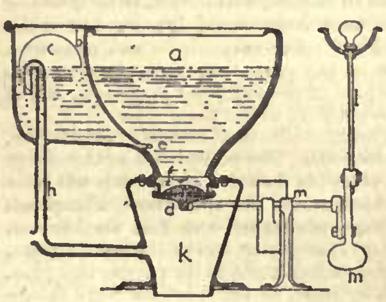

Fig. 80.

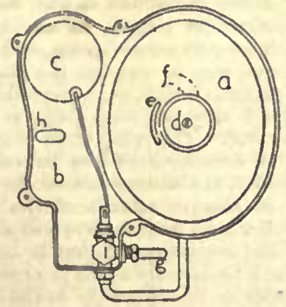

Fig. 81.

Alexander's Closet.

a, Bowl. b, Supply-valve compartment. c, Float for supply-valve. d, Valve. e, Opening between bowl and supply-valve compartment. f, Opening to wash valve. g, Water-supply pipe. h, Overflow. i, Supply-valve. k, Receiver. l, Hand-pull. n, Weights on rock-shafts.

ceiver. The height of water in the bowl may be regulated by adjusting the float. The overflow is "doubly trapped and has an outlet for ventilation." These closets are furnished by Miller & Coates, of New York, made entirely of earthenware, or with an iron body in which the earthenware bowl is set; the side of the bowl forming, in this manner, one side of the supply-valve chamber.

Llewellyn's Closet. — In 1864, Peter Llewellyn, a Welshman, invented a closet belonging to this class in which the valve is worked by means of an eccentric inclined plane or cam that turns on a vertical axis. Motion is imparted to this axis either by means of a crank placed just above and parallel to the seat, or by means of a hand-pull connected by a combination of wheels with this upright axis. The valve is kept in position by means of a spring which encircles the axis. The arm to which the valve is attached has a projection or stud that rests on the cam, which, when the axis is turned either by the crank or hand-pull, travels or slides up or down the surface of the inclined plane, at the same time causing the valve to open or close. The valve is of metal and it has a seat of a more pliable material. This closet has a trapped overflow. The different parts of the closet and their arrangement are clearly shown in the illustrations.

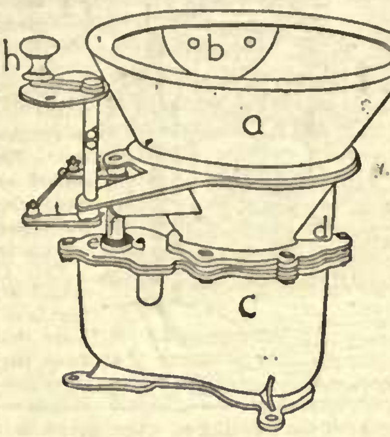

Fig. 82. — Perspective. — Llewellyn's Closet.

Preston's Closet. — There was a closet of this class invented in England by one Preston in 1876. The novelty consisted in three valves, each in its separate receiver, one directly below the other, and so arranged that when the top valve is open the second one is closed. In this way it is intended to shut off direct communication with the sewer.

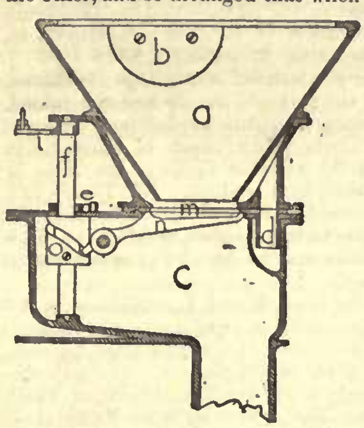

Fig. 83. — Section. — Llewellyn's Closet.

a, Bowl. b, Fan. c, Receiver. d, Overflow. e, Spring. f, Vertical axis. g, Connecting-rod. h, Knob for hand. i, Connecting-levers. m, Valve-seat. n, Valve. o, Cam, or inclined plane.

Rice & Sargent's Closet. — A closet was invented in this country in 1876 by Rice & Sargent. This closet was intended to be placed below the point of discharge. The spindle on which the valve works, and to which it is connected by an arm six or eight inches long, is turned by the same lever and at the same time that a piston, which fits into the cylinder below the receiver is pressed down. The waste matter is forced into the soil-pipe by the action of this piston. There is a valve at the entrance to the soil-pipe that opens only in a downward direction, so as to prevent the return of waste matter into the cylinder. This valve is held in position by a spiral spring. The mechanism of this closet does not appear to be as simple as in the "Bunnet" or "Sand" closets, (Figs. 46, 47, 49–51) both of which are intended for use below the water line. Among other closets of this class, in which the trap, when one is used, is below the floor-level, I will mention the "Victor" closet, in which the valve is moved by a toothed lever, similar to the Demarest valve-closets; Bolding's simple closet; Atwater's closet; Edwards's closet, worked by geared tooth wheels; Blackwood's closets, for he has invented several complicated ones belonging to the above class; James & Drewett's closet, similar to the Bramah, differing from it only in the combination of the levers for opening the valve. The closets just mentioned above are either in use at the present time or have been recently invented.

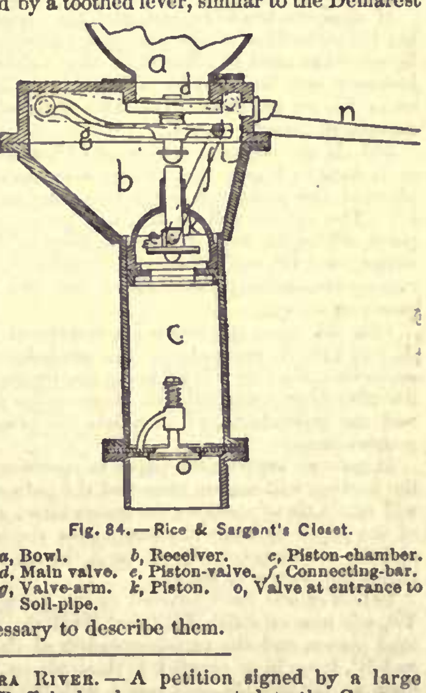

Fig. 84. — Rice & Sargent's Closet.

a, Bowl. b, Receiver. c, Piston-chamber. d, Main valve. e, Piston-valve. f, Connecting-bar. g, Valve-arm. k, Piston. o, Valve at entrance to Soil-pipe.

Other closets, which properly belong to this class and type have been patented and manufactured, but the variation is so slight from some of the closets that have been already described, that I do not think it necessary to describe them.

Tunnel under Niagara River. — A petition signed by a large number of capitalists of Buffalo has been presented to the Common Council asking that the right of way be granted to build a tunnel under Niagara River, the city to receive 25 per cent of the profits of the same when completed.

PAPERS ON PERSPECTIVE.—XX.

THE PRACTICAL PROBLEM.

AFTER all, the question remains, how is one to go to work, in a given case, to make a perspective drawing. The shape and size of the object to be drawn, a building, for instance, are, of course, supposed to be given, with the scale to be employed in the plane of the picture. The scale either may be assumed or may be determined by comparing the relative distances of the object and of the plane of the picture from the spectator.

392. The next thing to be determined is the *attitude* of the object; that is to say, the angle its principal lines shall make with a line drawn from the eye to the object. The direction of this line is in general purely arbitrary, being so chosen as to exhibit the building or other object in its best aspect. The plane of the picture is generally taken at right angles to this line, which then becomes the axis of the picture, some point near the middle of the object being then at the centre; but when it is possible, by giving the axis a slightly different direction, to bring the principal lines of the object at 45° with the plane of the picture, making the centre coincide with V^X, the "vanishing-point of 45°," it is best to do so. This adjustment is exemplified in Figure 138, Plate XXII.

393. The first thing to do after the attitude of the object is chosen, and the angle it is to make with the plane of the picture determined, is to fix the distance apart of the principal right-hand and left-hand vanishing-points, V^R and V^L. These points, which of course lie in the horizon, are generally set at the extreme limits of the table or drawing-board upon which the work is to be done. See Figure 137, A, Plate XXII, in which the assumed attitude of the object is shown by two lines drawn at right angles to one another, making the given angles with the picture. These lines may be drawn in any convenient place, it makes no difference where.

394. As the principal horizontal lines, R and L, vanishing at V^R and V^L, upon the horizon, are generally at right angles, the station-point S is, in plan, generally at the vertex of a right-angled triangle, of which the line $V^L V^R$, in the plane of the picture, is the hypothenuse. The *locus* of S is accordingly a horizontal semicircle, of which the line $V^L V^R$ is the diameter. The next step after fixing these points is, then, to describe such a semicircle, and to find upon it the point S, such that the line SV^R will be parallel to the right-hand side of the object, and SV^L to its left-hand side. A perpendicular dropped from this point upon the line $V^L V^R$ will give the position of the centre, C; a diagonal line bisecting the right angle will give the point V^X, the "vanishing-point of 45°" (44); and the lines SV^R and SV^L revolved into the plane of the picture will give respectively the right and left-hand points-of-distance, D^R and D^L. D^X, the point-of-distance of the diagonal line, may be obtained at the same time, if desired, by revolving SV^X into the plane of the picture, as in Plate IV, Figure 11.

If shadows are to be cast, and the vanishing-point of shadows V^S, lies beyond either of the principal vanishing-points, as it does in the figure, room must be allowed for the vanishing-point also. This space, however, may be saved by taking the sun in the plane of the picture, as in Figure 36, Plate VIII, with the vanishing-point of shadows at an infinite distance (184).

395. If the object is set just at 45°, as has been recommended, and as is done in Figure 138, its two sides making equal angles with the plane of the picture, it is not necessary to describe the semicircle at all. The centre will be half-way between V^L and V^R, the station-point will be the same distance in front of the centre, V^X will coincide with C, and D^L and D^R may be found as before. They will be almost exactly two-fifths of the distance from the centre to either vanishing-point, as shown.

396. All these operations are conducted in plan, the paper at 137, A, and 138, A, representing the ground-plane, or horizontal plane of projection, the line $V^L V^R$ being the projection of the horizon. This line also represents both the plane of the picture, *pp*, seen edgewise, and the ground-line, *g l*, in which the plane of the picture cuts the ground-plane.

If now we suppose the paper to represent the plane of the picture, the horizon will remain unmoved, the points V^R,V^L,V^X,D^R,D^L, and C will retain their positions, the ground-line, *g l*, will appear in the plane of the paper at some distance below the horizon, and parallel to it, and the station-point, S, will be in the air in front of the picture, opposite the centre, as shown.

397. Vertical lines, erected in the plane of the picture at V^L and V^R, will now establish TRZ and TLZ, the traces of the principal vertical planes, and the vanishing-points of the inclined lines M, M′, N, and N′, lying in or parallel to these planes, may be fixed by drawing lines at D^L and D^R, that make, with the horizon, the same angles, α and β, that the lines themselves make with the horizontal plane. The points in which these lines intersect the traces of the vertical planes will give the vanishing-points V^M,$V^{M'}$,V^N, and $V^{N'}$.

These points being determined, the traces of inclined planes, TRN, TRN′, TLM, TLM′, can be drawn whenever they are needed, and the V^P and $V^{P'}$ the "vanishing-points of hips and valleys," can be ascertained.

398. All this preliminary work is concerned solely with the *direction* of lines and planes, not with their position. Before constructing a perspective drawing by their aid it is necessary to determine also the *position* to be assigned to the object; that is to say, to some prominent point in it. The point generally selected is the lower end of the nearest corner.

The first thing to be done is to determine how far to the right or left of the centre this point shall be set. It is generally on the right if the left-hand side of the object is to be made prominent, and *vice versa*. In Figure 137 the position of the front corner is assumed, and, the building being rather a large one, it is set considerably to the right of the centre. In Figure 138 both the attitude and the position of the building are determined upon the orthographic plan at A.

399. The position to be given to the object, horizontally, having been determined, the next thing is to draw a perspective plan of it; *i. e.*, to put into perspective its horizontal projection.

400. The horizontal plane upon which the perspective plan of the object to be represented is supposed to be drawn is called the ground-plane. The line in which the ground-plane cuts the plane of the picture, is called, as has been said, the ground-line, or line of horizontal measures. It is convenient, for many reasons, to have this as far as may be below the horizon, and it is well to draw it upon a separate piece of paper, covering the lower part of that upon which the drawing is to be made, so that the construction lines that lie in its neighborhood may not deface the picture, and so that they may be removed and used again, if necessary, instead of being erased.

401. This is shown in Figures 137, B, and 138, B, in which the horizon, with the various vanishing-points and points-of-distance, are transferred directly from Figures 137, A, and 138, A, and the ground-line, *g l*, drawn in an inch or two lower down. In practice the Figures A and B would be drawn one over the other, on the same paper.

402. It is customary to have the front corner of the building, or other object to be drawn, lie in the plane of projection, or, which comes to the same thing, to have the imaginary model touch the plane of the picture, as in these figures. In the perspective plan, then, the horizontal projection of this corner will lie in the ground-line, as shown at the point I. Lines drawn from this point, as an initial-point, to the principal horizontal vanishing-points, V^R and V^L, are the front lines of a perspective plan. They are infinite lines, upon which the horizontal dimensions of the object can be cut off by means of the points-of-distance already established, the ground-line serving as a line of horizontal measures.

403. The length of the right-hand side of the building, or other object, with its subdivisions, being then laid off upon the ground-line to the right of this point, and of the left-hand side towards the left, may be transferred to these infinite perspective lines by drawing lines *across* them to the right and left points-of-distance respectively.

If the principal horizontal lines of the perspective plan lie at 45° with the ground-line, as in Figure 138, one set of the right angles in which they meet will be bisected by lines drawn to the centre, and the others by lines drawn parallel to the horizon. The hips, also, on the right and left of the roofs, will be parallel to the picture, and will be drawn parallel to the traces of the planes in which they lie, as shown in the figure.

404. Dimensions taken by scale upon the ground-line may be transferred to lines lying in the horizontal plane and parallel to the plane of the picture, and accordingly parallel to the ground-line, by drawing lines to any point on the horizon as a vanishing-point of parallel lines. The fence in Figure 137, B, is drawn in this way.

405. As many different perspective plans may be made as the complexity of the subject may seem to require, and they may be above or below the picture, as may be most convenient. Figure 140 shows three perspective plans, and Figure 137 two. It is not, of course, necessary to complete the plan of any parts that cannot be seen. In general it suffices to make the plan of the two sides that show, and of such more remote portions as are visible above these sides.

406. The perspective plan being made, or at any rate fairly begun, the drawing itself may be commenced. The perspective of the object itself, lies directly above the plan, but how far above depends upon the relative altitude of the object and of the spectator. The points on a level with the eye will always, of course, be seen on the horizon. The *starting-point*, that is to say, the lower end of the front corner, will lie directly above the corresponding point in the perspective plan, and as far below the horizon, by scale, as the spectator's eye is supposed to be above the point itself, as at *c*, Figure 137.

407. The perspective plan, drawn in the plane of the picture, suffices to determine all horizontal dimensions; that is to say, the position of all vertical lines.

The position of horizontal lines is determined by laying them off by scale upon a line of vertical measures. When the nearest corner touches the plane of the picture it is generally used for this purpose. This line lies in the right-hand vertical plane, R Z, and in the left-hand vertical plane L Z, and serves as a line of vertical measures for both, as at *v v* in Figures 137, B, and 138, B. The scale employed is the same as that used upon the ground-line for determining the horizontal dimensions of the perspective plan, since all lines in the plane of projection are drawn to the same scale.

408. But any plane occurring in the object may be prolonged until

it cuts the perspective plane, and have a line of measures of its own, as at $v' v'$ in Figure 137, B, which serves as an independent line of measures for the end of the wing. The vertical dimensions taken upon these lines of measures may be transferred directly to any vertical line which lies in the vertical plane, and which is accordingly parallel to the line of vertical measures, by means of the vanishing-points V^R and V^L. In this way is determined the position of all horizontal lines in Figures 137, B, and 138, B, the vertical lines erected from the corresponding lines in the perspective plans serving to determine their length.

409. If any part of the object advances in front of the principal vertical planes, or, in plan, in front of the principal lines of the perspective plan, as is the case with the wing of the building shown in Figure 137, its plan can be drawn in perspective by prolonging the leading perspective lines *in front* of the perspective plane, as is shown in Figure 139. In this figure the dimensions to be set off upon this part of a left-hand line, L (or of a right-hand line, R), are set off upon the ground-line to the right of the initial-point instead of to the left (or to the left instead of to the right); and in transferring them to the perspective line they are brought forward away from the point-of-distance, instead of being carried backward toward it, as before.

410. The length of the wing of the building in Figure 137 is ascertained in this way: The dimension R_2 taken from the elevation above, is laid off upon the ground-line *to the left* of the point I, the initial-point of the perspective line R, and is transferred to the prolongation of that line in front of the plane of projection and below the ground-line by means of the point-of-distance, D^R, as in Figure 139. Another way of drawing such objects, or parts of an object, is shown in the second perspective plan at the bottom of the same figure. The point *a*, where the wing joins the main building, having been ascertained as before, by measuring off upon the principal left-hand line the distance, L_1, a right-hand line, directed towards the right-hand vanishing-point, V^R, is drawn through the point *a* until it intersects the ground-line at *b*. If now a second line be drawn through *a*, directed upon D^R, the right-hand point of distance, and cutting the ground-line at *d*, the distance *b d*, intercepted upon the ground-line, will be the real length of the line *b a*, and the real length of the wing, R_2, may be laid off upon the ground-line from *d* and transferred to the line *a b* by means of D^R, as shown. If parts of the object to be drawn are advanced not only in front of the principal places, but in front of the plane of projection, as often happens with the cornices of buildings, and steps and platforms, as shown in Figure 138, they may be put into the perspective plan by the methods just described. In this case the points and lines in which the several lines and planes cut the plane of projection may be set off by scale. The points *a a*, at which the eaves of the building in the figure, for example, pierce the plane of projection, are equally far above the horizon, and on a level with the top of the corner between them.

411. Figure 140, which is a view of the spire of the Church of St. Stephen's, Walbrook, illustrates the use of several perspective plans, and also the advantage of taking a plane of projection considerably in front of the object instead of in contact with it. The extension of the right-hand and left-hand vertical planes of the tower until they cut the plane of projection gives five lines of vertical measures, on each side, all of which are quite outside of the picture, instead of one in the middle of it, as in the case when the front corner is taken as the line of measures. These are lettered I^R, $I^{R'}$, etc., I^L, $I^{L'}$, etc., respectively. This entirely frees the picture from constructive lines.

Setting the objects some distance behind the perspective plane of course makes its perspective smaller, but this may be met by setting off the dimensions upon the lines of measures at a larger scale, which, when the position of the vanishing-points remains unchanged, is equivalent to moving the plane of the picture nearer to the object itself. In Figure 140, the scale employed at B for horizontal distances upon the ground-line, and for vertical dimensions in the lines $I^{R'}$, $I^{L'}$, etc., is double that of the elevation at A, from which the dimensions are taken.

412. The same result may be produced by employing scales of vertical measures beyond the object. If these are set up half-way between the lines of vertical measures and their corresponding vanishing-points, the scale to be used will be half as large, as in the figure, at $v\ v$, $v'\ v'$, etc., where the heights set off are the same as in the elevation alongside.

If both scales of height are used, as in the figure, one on the right of the picture and another at half the scale, on the left, the use of the left-hand vanishing-point, V^L, may be dispensed with, the perspectives of the horizontal lines being put in by drawing lines between the corresponding points on the two scales.

413. In the largest of the perspective plans employed in the figure, below the picture, advantage is taken of the fact that the two sides of the tower are exactly alike, to dispense also with the use of the point D^R. The points ascertained upon the left-hand side by means of the left-hand point-of-distance, D^L, are transferred to the right-hand side by means of the diagonal line directed towards V^X, the "vanishing-point of 45°."

Instead of sinking the perspective plan in order to prevent the angles of intersection from being too acute, and accordingly putting the ground-line four or five inches lower down, an auxiliary horizon H′ H′, is, in this case, drawn in four or five inches above the real horizon, the ground-line being retained, and the lines of the perspective plan are directed to the vanishing-points and points-of-distance found upon this new horizon.

414. In completing a perspective drawing, many special devices may be employed to alleviate labor. Of these the most important are the different ways of dividing lines in a given ratio, the different ways of casting shadows by natural or by artificial light, the use of points of half-distance or quarter-distance, and the various other devices for bringing the work within small limits,—the employment of lines already existing, as traces of auxiliary planes, and the special processes to be followed in putting circular arcs into perspective, with the practical adjustments to be made in the results. It is not necessary again to go into these details of procedure. They have been treated in previous papers of this series.

THE END.

FROM BAYREUTH TO RATISBON.—NOTES OF A HASTY TRIP.—V.

I MUST confess that my recollections of Würzburg are of the most confused description. We were there but a single day, part of which was spent in profitless drives, and were without a proper hand-book—though I learned afterwards that a very good one might have been had. In some places such circumstances might have resulted in little being seen yet that little being clearly perceived and definitely remembered. In Würzburg, however, we saw a great deal, yet all of it was of such a curiously conglomerate nature that it is small wonder no very sharp recollection was impressed upon the mind. Surely in no town can a greater architectural jumble be found. Not only is each building in contrast with its next neighbor bot each has in almost every case been built over and repaired and restored and patched and "improved" till it has become a motley shape indeed. The Protestant desecrator—stripping, plundering and whitewashing—seems to have left no traces in the peculiarly Catholic town of Würzburg. But the Catholic desecrator—"Jesuitizing," re-decorating, and filling every space with his plaster clouds and angels—has had the fullest swing. And the hand of the modern restorer has not undone his work. In other places both Catholics and Protestants have seen the wisdom of undoing, in so far as possible, the mischief wrought by their fathers; but in Würzburg every generation has added and none has disturbed its additions. I can imagine no place better adapted for showing what the *Baroque* decorator was capable of in his most German and least artistic moods.

The building records of the town go back to very remote antiquity. The first *Marienkapelle* is known to have been consecrated in 706. The first bishop—precursor of the long line of proud, turbulent, and powerful ecclesiastical princes of Würzburg—was appointed in 741. He was afterwards canonized as St. Burkhard and one of the chief churches of the town was re-christened in his honor. It was a church he himself had founded, but the building having been burned it was removed to a new site near by and rebuilt between 1033–1045. The main structure still exists, with a flat, ceiled nave and aisles, and alternate piers and stumpy columns.

From the days of Burkhard on to the last expiring moments of Rococo art Würzburg seems to have been ruled by men with a peculiar taste for building. In every epoch we hear of much undertaken and large sums expended. It is wonderful, therefore, that with a single exception there is not a satisfactory building left—one which is anything but a conglomerate of little bits of every age. For example, there is scarce a trace left of the cathedral building which was erected about 1030. Of the next structure (1133–1139) we possess a good deal, but so overlaid by later work as to be imperceptible within, and to show without only the upper portion of the fine long nave, the lower being surrounded by later additions of every sort. Originally flat-roofed, it was recovered so late as 1606 with a barrel vault, and other parts were renewed at many epochs. The adjoining cloisters were built in 1331, but received new vaults and windows in 1424, and never does there seem to have been the least effort to make the newer work harmonize with the old, and finally about 1700 the whole interior of the church was renovated at great expense in the most florid *Baroque* style. Looking at it one can hardly believe even the evidence of the outer walls that any element is older than that date. Occasionally, as in Dresden, a *Baroque* architect of the better sort could build a fine church of his own; but such work is quite antipodal to the "decoration" which inferior artists saw fit to apply to older buildings. Words fail to describe the vulgar brutality of the fittings of these Würzburg churches. They are not even grotesque—they are simply hideous masses of plaster, wood and paint. In one church—whether the cathedral or not I do not remember—from a fine Romanesque chancel-arch hang festoons of plaster curtains, colored a rich and rare magenta, and looped back by the hands of life-size plaster angels, poised apparently on nothing. One may be a poor Protestant, a lukewarm advocate of relig-

ious truth and freedom, and yet hate the Jesuits with a holy hatred for the sort of decoration — or desecration rather — upon which, rightly or wrongly, their name has been fastened. Just across a little square from the cathedral is the *Neumünster* church, very similar in original construction and in present condition. Between the two, in the open street, stands a concoction which quite matches the chancel adornments I have noted. On a large, round, raised sub-structure of stone is a group of life-size figures—a *Pieta* or something of the sort, I forget what. Nor could I tell what the figures were made of; plaster, apparently; at any rate they had been painted brilliantly after the manner of Madame Tussaud's family, but were battered and weatherworn, surrounded by artificial flowers, crucifixes, etc., and covered by a canopy supported on columns, the ceiling of which was painted bright blue and sprinkled with stars. It was a lovely work of art—a sort of vulgar *tableau vivant,* moulded and colored and set up in the public street. Of course its period has bequeathed to our day many similar structures; but I have never seen one quite so flagrantly awful. Verily, one felt in looking at it, there are compensations in being born in America. If we have received no bequests of beauty we are at least not burdened with such things as this. There is, however, as I have said, one church in Würzburg which is worth seeing for itself and not merely as a curious exemplification of how much diversity and confusion can be combined in a single structure. This is the *Marienkirche* which stands on the gay, bustling, crowded, quite festive market-place — a square that, like the rest of the busy little city, is in strongest contrast with the dead-and-alive aspect of Bamberg. The vivid life and energy which have worked so destructively for many centuries on the buildings of the town works still to make it at least a bright and vital abode of modern men. The church is a late Gothic building—founded in 1377 on the site of the former Jewish synagogue which was burned in one of the fearful mediæval outbreaks of Christian hatred. The portals, the vaulting and the details of the exterior are still later, dating from between 1434 and 1479. It is one of those buildings which are so common in late German work and are called *Hallenkirchen* — a term for which there is, I think, no definite technical equivalent in English. The three aisles and the choir, that is to say (there are no transepts), are of equal height, divided by tall columns without capitals which branch out into an elaborate system of vaulting. Usually the scheme is unattractive as compared with that which gives low side divisions and a clerestory; but sometimes, as notably in St. Stephen's in Vienna, where the proportions are good and the details of pillars and vaulting are beautiful, the effect is very charming.

This church seemed to me one the best of the sort I had seen. Whether it had never been Jesuitized, or had been freed in recent days from vile additions I do not know. The former case is more probable, as such open interiors do not readily lend themselves to the work of post-Renaissance decorators. At all events the interior offered quite a refreshing contrast to its neighbors. Perhaps the greatest interest of the structure lies, however, in the sculpture of the exterior, which is very profuse and unusually picturesque and fine. Especially is this true of the three great doorways with their tympanums giving elaborate scenes from the life of the Virgin. I know of no better examples of late Gothic sculpture — both as to technical execution and grotesquely imaginative and naïve conception. Würzburg was, in the fifteenth and sixteenth centuries, the home of a noteworthy group of sculptors, chief among them being Riemenschneider, of whom I have already spoken in describing Bamberg. He wandered through all the neighboring towns as was the custom of his day, but his head-quarters were in Würzburg, and though many of his works have perished—for examples, some made for the cathedral, including a pyx which reached to the ceiling — many still remain. Among the best is the group of Adam and Eve under a canopy in front of one of the doors of this church; a St. Stephen in the interior; the great crucifix in the cathedral; and his own burial memorial, now preserved in the local Historical Museum. The still existing guild-books of the town give a long list of his assistants and apprentices, and their work is the best tribute to their excellence.

It may indeed be said that if Würzburg offers the student of pure architecture little of the first importance, its riches of minor art well make up the lack. Not only its sculpture, but its iron-work is most remarkable. We are here in the very centre of this latter art. Nowhere outside of southern Bavaria, I think, not even in northern Italy or the Netherlands, can one so well realize the possibilities of this metal now held in such low esteem. The purposes to which artistically treated iron are put are as various as the styles by means of which beauty has been attained. One gets a quite peculiar enthusiasm for the work, and is apt to do it great honor for the reason that styles which produce a bad effect in other materials may be extremely beautiful in this. From early days we have the stern, almost grandly simple work on locks and hinges, and from every later time — from Renaissance and Rococo, as well as from Gothic years—the most wonderful creations in the way of fountains, window-screens, tympanums, gates, lamps, candle-stands, and the great chancel-screens so commonly employed in later periods. One blessed spot for the eye to rest upon in this abused cathedral is the huge screen, probably ten or more feet in height, which closes the immense chancel opening. It is of Rococo days, and looking at its wonderfully imaginative wealth and grace of line one is tempted to say that whatever may be the case with other materials the *Style Louis Quinze* with its delicate yet vitally organized vagaries is the very best for iron-work. But as one visits church after church, or even walks the streets and sees example after example from other epochs, the same decision is successively arrived at with regard to many other ways of working. The profusion of such work which still remains in place does not at all prepare the traveller for the more than equal profusion of examples he will find in every Bavarian museum. In no branch was the artisan of the middle and later ages so prolific, and in none were his creations more diverse, more happily and freshly and spontaneously artistic.

Gothic art lived long and died hard in this part of the world. Few examples of complete Renaissance work without a Gothic admixture are to be dated earlier than 1600. The fact is unfortunate in a way, for it leaves us no good early Renaissance examples. We pass from dying Gothic into dying Renaissance; but sometimes we get an at least interesting mixture of the two styles. Several such are to be found in the many large, later structures of Würzburg, built in the sixteenth century—in the church connected with the university, for example, which combines Renaissance forms with an almost Gothic lightness of structure, and with true late Gothic windows. The bishop's palace is an immense eighteenth-century structure in a park on the outskirts of the town, built after the model of Versailles. Inside it is said to be very well planned, very large and sumptuous; and as parts of it were frescoed by Tiépolo it is undoubtedly worth a visit; but we had no time to do more than glance at its formal exterior and admire the beauty of its great iron gate—Rococo again, each very different from the other, and each more fantastically lovely than its fellow.

I must give a final word to the bric-à-brac shops of the town. These snares of the enthusiastic traveller I found more interesting and a little less dangerous than those in most other places—perhaps because Würzburg is not on the line of common foreign travel. Really fine articles are everywhere dear to-day of course. The time for picking up bargains in splendid examples of the minor arts has long gone by. The humblest dealer at last knows their worth. But such things were much less dear in Würzburg than in towns like Munich or Nuremberg, for example. And in smaller, less pretentious articles much satisfactory foraging may be done. Good bits of old work in the way of iron, and pewter, and brass, and even of bronze may be bought for very little. Of course with more important things the purchaser must everywhere be on his guard against modern copies which the German workman of to-day makes and "antiquates" with quite infernal skill, and the dealer swears to with more than infernal floridity of speech; but in little things which would not pay to duplicate the danger is less, and their artistic value is often great. For three dollars I got, in a most bewildering Würzburg shop, a brass holy-water vessel of late Renaissance workmanship, that is quite lovely, and for a few cents a small bronze *repoussé* mask (from a Gothic sepulchral slab, apparently) of the most naïve and charming sort. Such little trophies may not seem very valuable when one is fresh from the splendid treasures of church and museum; but a voyage across the Atlantic raises their worth to an extraordinary degree.

I should add that while the Würzburg collections of minor art do not equal those of Bamberg, yet the University Library contains many precious manuscripts, miniatures, and also a very large assemblage of prints known as the "Wagner Collection."

M. G. Van Rensselaer.

THE ILLUSTRATIONS.

HORATIO LYON MEMORIAL LIBRARY, MONSON, MASS. MR. STEPHEN C. EARLE, ARCHITECT, BOSTON, MASS.

The walls are of two shades of Monson granite outside, with brick backing, laid hollow, and the building is nearly fire-proof in its construction, the floors being of iron and brick, and roof framing of iron. The cost was about $25,000, the money being given by Mrs. Caroline R. Dale, daughter of Mr. Lyon, and an endowment of $20,000 was given by Mrs. Lyon. W. N. Flynt & Co., owners of the Monson granite quarries, were the builders.

FIRST UNIVERSALIST CHURCH, NO. ATTLEBORO', MASS. MESSRS. WM. R. WALKER & SON, ARCHITECTS, PROVIDENCE, R. I.

The outside walls of the Church and first story of the Rectory and Sunday-School building are of dark brown Croton front brick, laid in black mortar, with finish of Long Meadow brownstone, Kibbey quarry, and Trenton brick both ornamented and plain, laid in red mortar. The walls of second story of the Rectory and Sunday-School building are covered with red slate, and all roofs with Brownville black slate. The framing of Church is of Southern hard-pine, and the pews are of cherry. Over Sunday-School Room are parlor, dining-room and kitchen for social gatherings.

HOUSE FOR ROBERT MAGRUDER, ESQ., ARLINGTON, MD., MESSRS. F. E. & H. R. DAVIS, ARCHITECTS, BALTIMORE, MD.

PERSPECTIVE DIAGRAMS. — PLATE XXII.

ENTRANCE TO ASTON HALL, WARWICKSHIRE, ENGLAND, DRAWN BY MR. JOHN C. SMITH.

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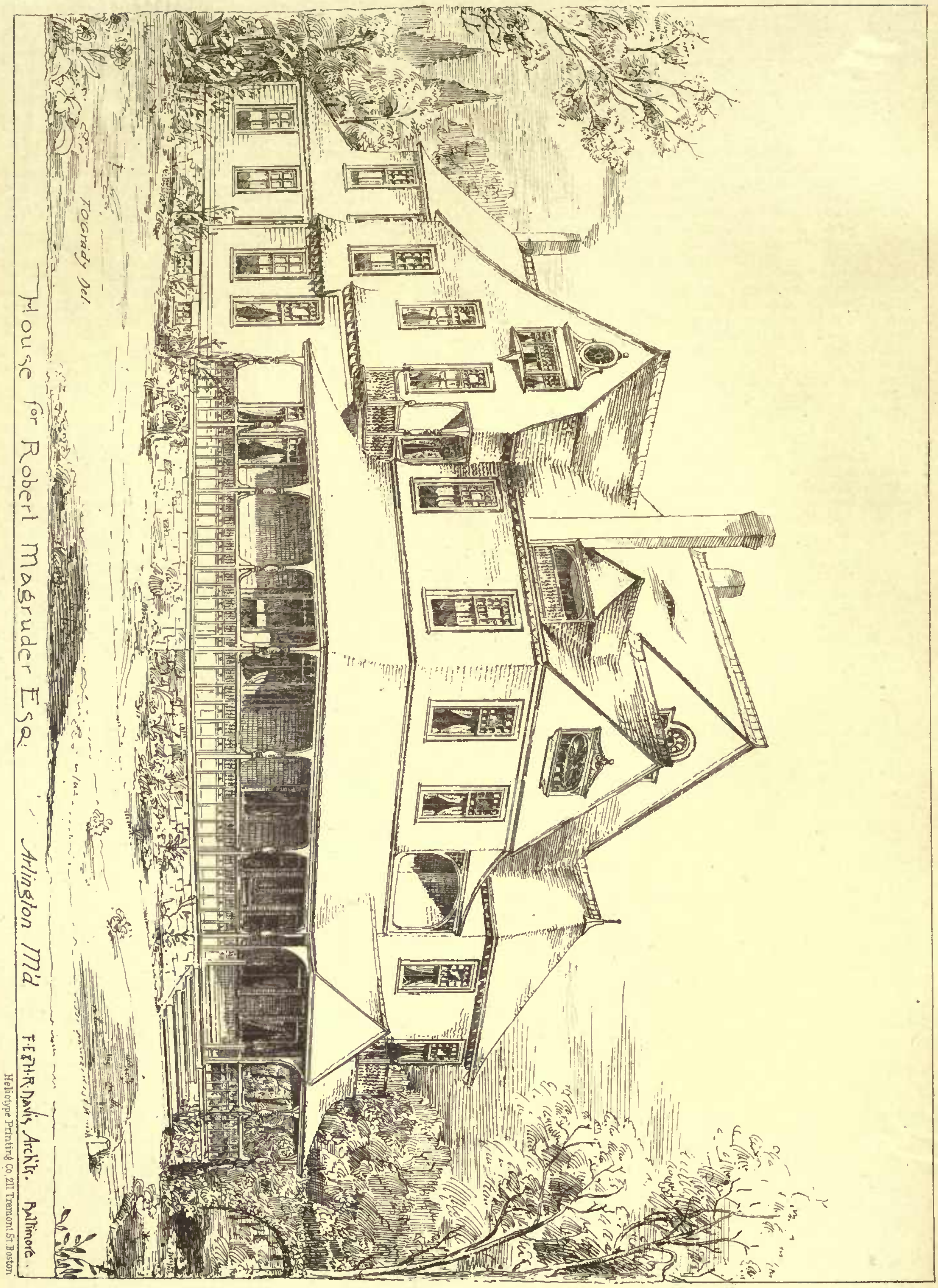

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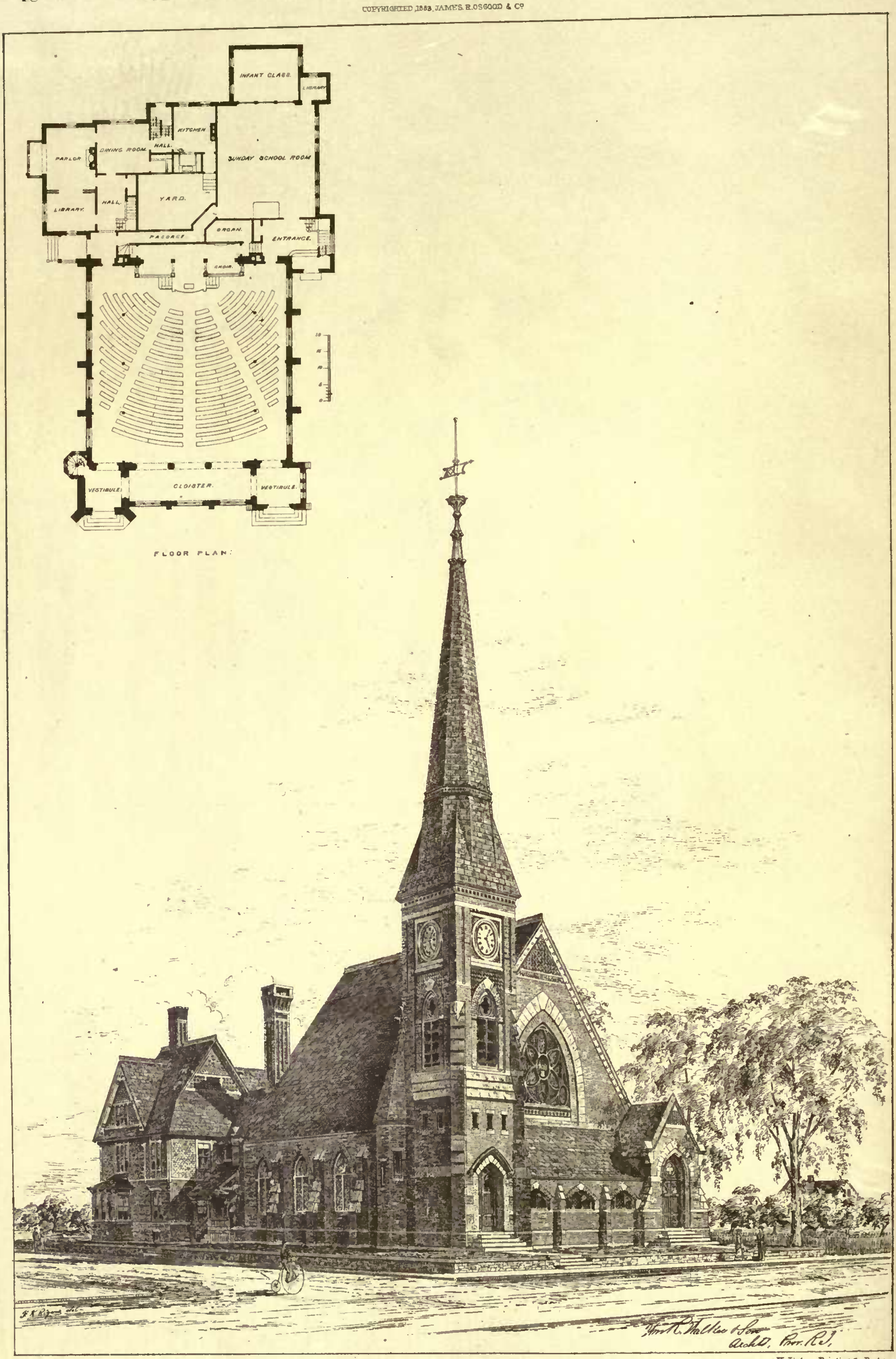

Heliotype Printing Co. Boston

1ST. UNIVERSALIST CHURCH & NORTH ATTLEBORO, MASS.

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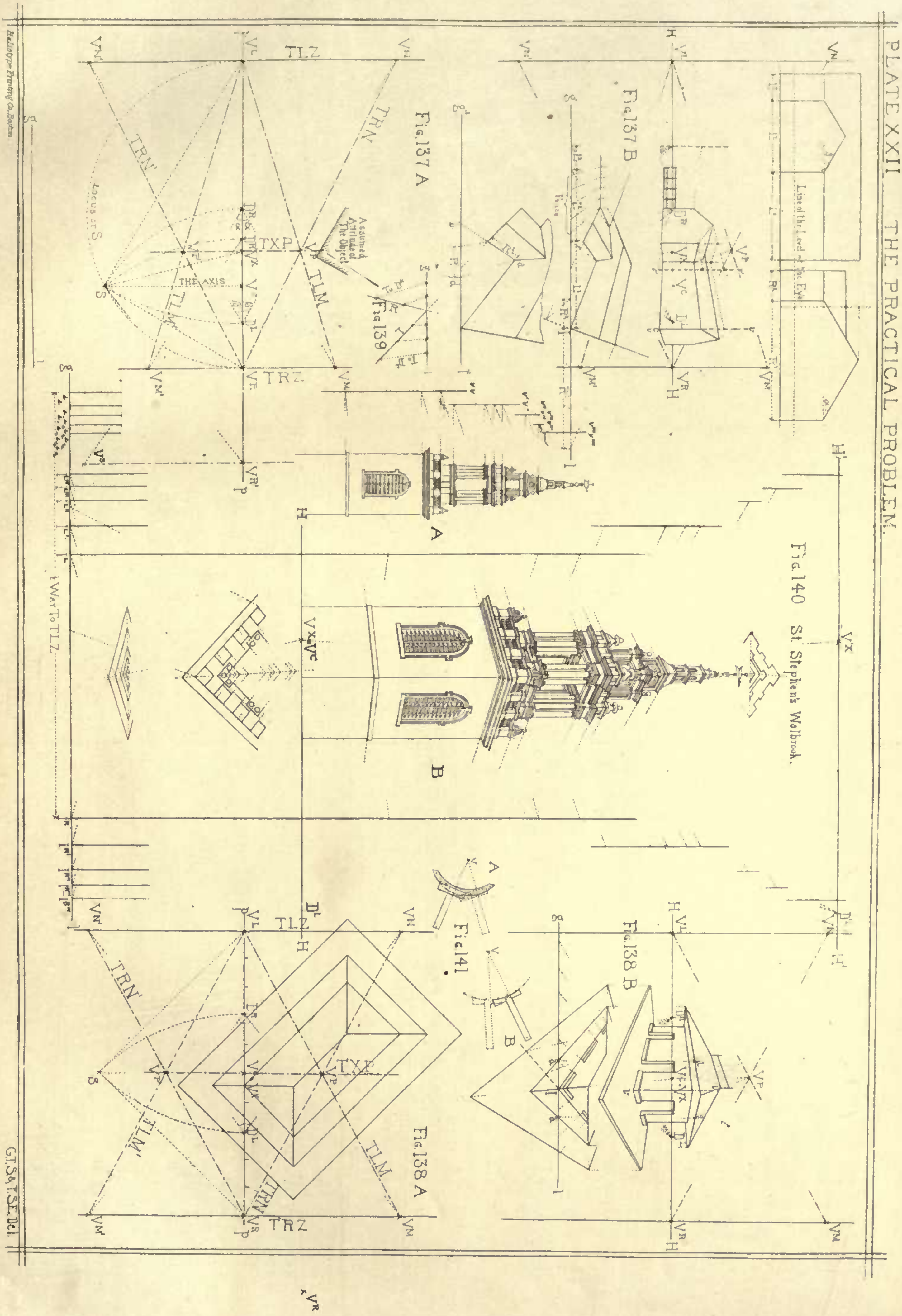

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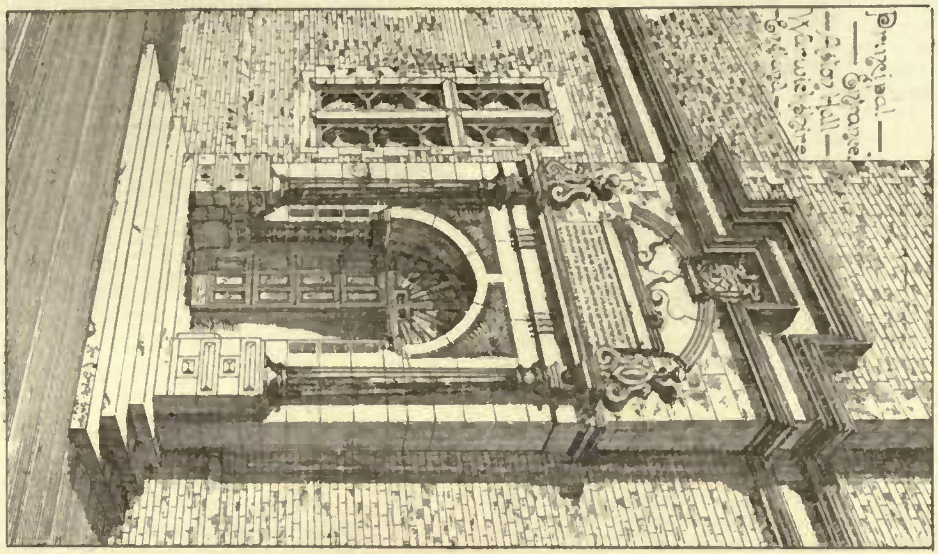

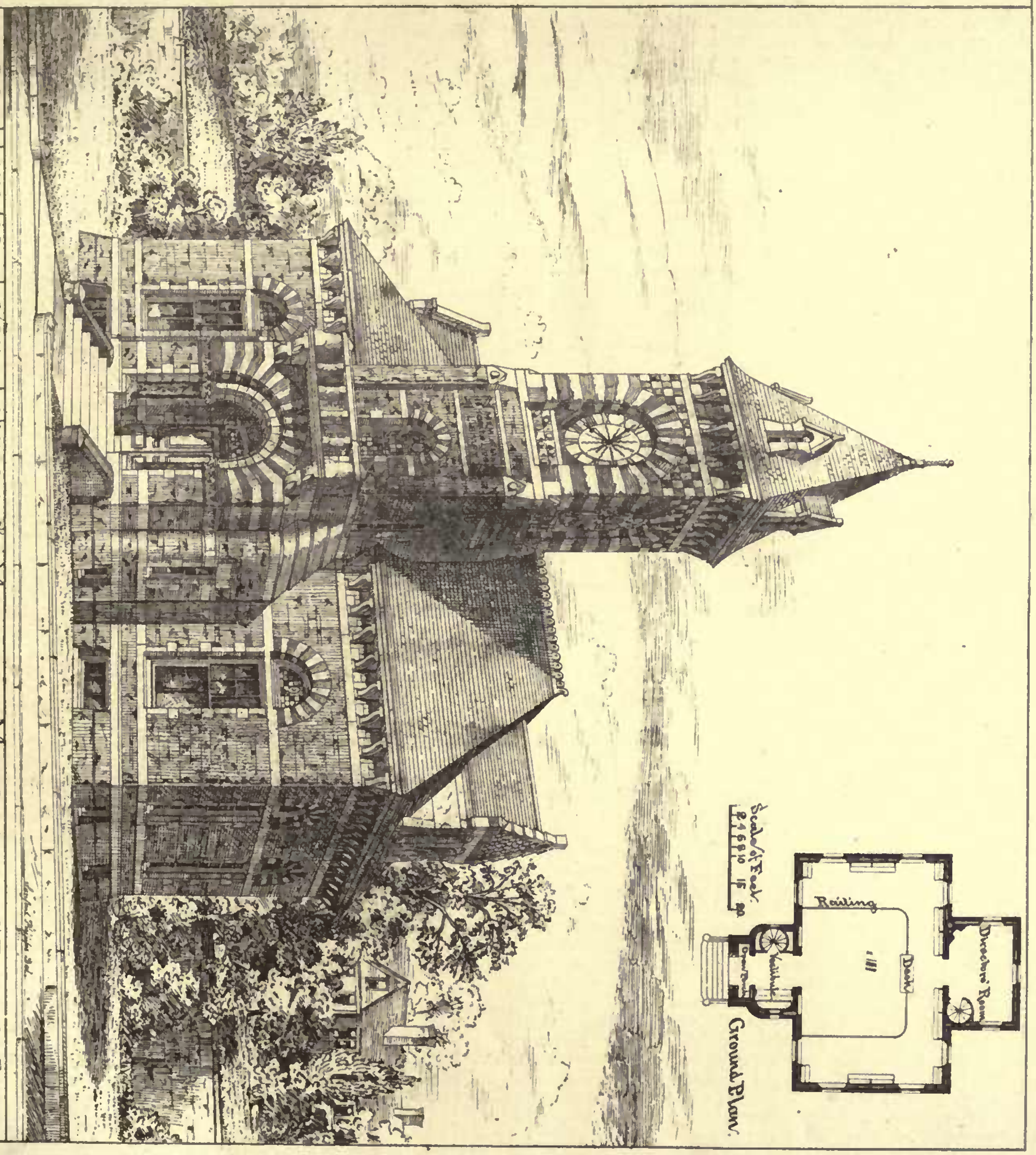

Horatio Lyon Library * Monson, Mass · Stephen C. Earle, Archt. Boston.

Heliotype Printing Co. 211 Tremont St. Boston

"HOME, SWEET HOME."[1]

My intention is to bring to your notice some of the many causes which result in unhealthy dwellings, particularly those of the middle classes of society. The same defects, it is true, are to be found in the palace and in the mansion, and also in the artisan's cottage; but in the former cost is not so much a matter of consideration, and in the latter the requirements and appliances being less, the evils are minimized. It is in the houses of the middle classes, I mean those of a rental at from £50 to £150 per annum, that the evils of careless building and want of sanitary precautions become most apparent. Until recently sanitary science was but little studied, and many things were done a few years since which even the self-interest of a speculative builder would not do now-a-days, nor would he be permitted to do by the local sanitary authority. Yet houses built in those times are still inhabited, and in many cases sickness and even death are the result. But it is with shame I must confess that, notwithstanding the advance which sanitary science has made, and the excellent appliances to be obtained, many a house is now built, not only by the speculative builder, but designed by professed architects, and in spite of sanitary authorities and their by-laws, which, in important particulars are far from perfect, are unhealthy, and cannot be truly called sweet homes. Architects and builders have much to contend with. The perverseness of man and the powers of nature at times appear to combine for the express purpose of frustrating their endeavors to attain sanitary perfection. Successfully to combat these opposing forces, two things are above all necessary, viz.: first, a more perfect insight into the laws of nature, and a judicious use of serviceable appliances on the part of the architect; and second, greater knowledge, care, and trustworthiness on the part of workmen employed. With the first there will be less of that blind following of what has been done before by others, and by the latter, the architect, who has carefully thought out the details of his sanitary work, will be enabled to have his ideas carried out in an intelligent manner. Several cases have come under my notice, where by reckless carelessness or dense ignorance on the part of workmen, dwellings, which might have been sweet and comfortable if the architect's ideas and instructions had been carried out, were in course of time proved to be in an unsanitary condition. The defects, having been covered up out of sight, were only made known in some cases after illness or death had attacked members of the household. In order that we may have thoroughly sweet homes, we must consider the localities in which they are to be situated, and the soil on which they are to rest. It is an admitted fact that certain localities are more generally healthy than others, yet circumstances often beyond their control compel men to live in those less healthy. Something may, in the course of time, be done to improve such districts by planting, subdrainage, and the like. Then, as regards the soil: our earth has been in existence many an age, generation after generation have come and passed away, leaving behind accumulations of matter on its surface, both animal and vegetable, and although natural causes are ever at the work of purification, there is no doubt such accumulations are in many cases highly injurious to health, not only in a general way, but particularly if around, and worse still, under, our dwellings. However healthy a district is considered to be, it is never safe to leave the top soil inclosed within the walls of our houses; and in many cases the subsoil should be covered with a layer of cement-concrete, and at times with asphalt on the concrete. For if the subsoil be damp, moisture will rise; if it be porous, offensive matter may percolate through. It is my belief that much of the cold dampness felt in so many houses is caused by moisture rising from the ground inclosed *within* the outer walls. Cellars are in many cases abominations. Up the cellar steps is a favorite means of entrance for sickness and death. Light and air, which are so essential for health and life, are shut out. If cellars are necessary they should be constructed with damp-proof walls and floors; light should be freely admitted; every part must be well ventilated; and, above all, no drain of any description should be taken in. If they be constructed so that water cannot find its way through either walls or floors, where is the necessity of a drain? Surely the floors can be kept clean by the use of so small an amount of water that it would be ridiculous specially to provide a drain.

The next important, but oft-neglected precaution is to have a good damp-course over the *whole* of the walls, internal as well as external. I know that for the sake of saving a few pounds (most likely that they may be frittered away in senseless, showy features), it often happens that if even a damp-course is provided in the outer walls, it is dispensed with in the interior walls. This can only be done with impunity on really dry ground; but in too many cases damp finds its way up, and, to say the least, disfigures the walls. Here I would pause to ask: What is the primary reason for building houses? I would answer that, in this country at least, it is in order to protect ourselves from wind and weather. After going to great expense and trouble to exclude cold and wet, by means of walls and roofs, should we not take as much pains to prevent them rising from below, and attacking us in a more insidious manner? Various materials may be used as damp-courses. Glazed earthenware perforated slabs are perhaps the best, when expense is no object. I generally employ a course of slates, breaking joint, with a good bed of cement above and below; it answers well and is not very expensive. If the ground is irregular, a layer of asphalt is more easily applied. Gas-tar and sand is sometimes used, but it deteriorates and cannot be depended upon for any length of time. The damp-course should invariably be placed *above* the level of the ground around the building, and *below* the ground-floor joists. If a basement story is necessary, the outer walls below the ground should be either built hollow or coated externally with some substance through which wet cannot penetrate. Above the damp-course, the walls of our houses must be constructed of materials which will keep out wind and weather. Very porous materials should be avoided, because, even if the wet does not actually find its way through, so much is absorbed during rainy weather, that in the process of drying, much cold is produced by evaporation. The fact should be constantly remembered, viz.: that evaporation causes cold. It can easily be proved by dropping a little ether upon the bulb of a thermometer, when it will be seen how quickly the mercury falls, and the same effect takes place in a less degree by the evaporation of water. Seeing, then, that evaporation from so small a surface can lower temperature so many degrees, consider what must be the effect of evaporation from the extensive surfaces of walls inclosing our houses. This experiment (thermometer with bulb inclosed in linen) enables me as well to illustrate that curious law of nature which necessitates the introduction of a damp-course in the walls of our buildings; it is known as capillary or molecular attraction, and breaks through that more powerful law of gravitation, which in a general way compels fluids to find their own level. You will notice that the piece of linen over the bulb of the thermometer, having been first moistened, continues moist, although only its lower end is in water, the latter being drawn up by capillary attraction; or we have here an illustration more to the point, a brick which simply stands with its lower end in water, and you can plainly see how the damp has risen. From these illustrations you will see how necessary it is that the brick and stone used for outer walls should be as far as possible impervious to wet; but more than that, it is necessary the jointing should be non-absorbent, and the less porous the stone or brick, the better able must the jointing be to keep out wet, for this reason, that when rain is beating against a wall, it either runs down or becomes absorbed. If both brick and mortar, or stone and mortar be porous, it becomes absorbed; if all are non-porous, it runs down until it finds a projection, and then drops off; but if the brick or stone are non-porous, and the mortar porous, the wet runs down the brick or stone until it arrives at the joint, and is then sucked inwards. It being almost impossible to obtain materials quite water-proof, suitable for external walls, other means must be employed for keeping our homes dry and comfortable. Well-built hollow walls are good. Stone walls, unless very thick, should be lined with brick, a cavity being left between. A material called Hygeian Rock Building Composition has lately been introduced, which will, I believe, be found of great utility, and if properly applied should insure a dry house. A cavity of one-half inch is left between the outer and inner portion of the wall, whether of brick or stone, which, as the building rises, is run in with the material made liquid by heat; and not only is the wall water-proofed thereby, but also greatly strengthened. It may also be used as a damp-course. Good, dry walls are of little use without good roofs, and for a comfortable house the roofs should not only be water-tight and weather tight, but also, if I may use the term, heat-tight. There can be no doubt that many houses are cold and chilly, in consequence of the rapid radiation of heat through the thin roofs, if not through thin and badly-constructed walls. Under both tiles and slates, but particularly under the latter, there should be some non-conducting substance, such as boarding, or felt, or pugging. Then, in cold weather heat will be retained; in hot weather it will be excluded. Roofs should be of a suitable pitch, so that in windy weather neither rain nor snow can find its way in. Great care must be taken in laying gutters and flats. With them it is important that the boarding should be well laid in narrow widths, and in the direction of the fall; otherwise the boards cockle, and form ridges and furrows in which wet will rest, and in time the metal decay. After having secured a sound water-proof roof, proper provision must be made for conveying therefrom the water which of necessity falls on it in the form of rain. All eaves-spouting should be of ample size, and the rain-water down-pipes should be placed at frequent intervals and of suitable diameter. The outlets from the eaves-spouting should not be contracted, although it is advisable to cover them with a wire grating to prevent their becoming choked with dead leaves, otherwise the water will overflow and probably find its way through the walls. All joints to the eaves-spouting, and particularly to the rain-water down-pipes, should be made water-tight, or there is great danger, when they are connected with the soil-drains, that sewer-gas will escape at the joints and find its way into the house at windows and doors. There should be a siphon-trap at the bottom of each down-pipe, unless it is employed as a ventilator to the drains, and then the greatest

[1] From a paper read by William Henman, A. R. I. B. A., before the Birmingham Architectural Association, January 30, 1883, and printed in the *Building News*.

care should be exercised to insure perfect jointings, and that the outlet be well above all windows. Eaves-spouting and rain-water down-pipes should be periodically examined and cleaned out. They ought to be painted inside as well as out, or else they will quickly decay, and if of iron, they will rust, flake off, and quickly become stopped. It is impossible to have a sweet home where there is continual dampness. By its presence chemical action and decay are set up in many substances which would remain in a quiescent state so long as they continue dry. Wood will rot; so will wall-papers, the paste used in hanging them, and the size in distemper, however good they may have been in the first instance; then it is that injurious exhalations are thrown off, and the evil is doubtless very greatly increased if the materials are bad in themselves. Quickly-grown and sappy timber, sour paste, stale size, and wall-papers containing injurious pigments, are more easily attacked, and far more likely to fill the house with bad smells and a subtle poison. Plaster to ceilings and walls is quickly damaged by wet, and if improper materials, such as road-drift, be used in its composition, it may become most unsavory and injurious to health. The materials for plaster cannot be too carefully selected, for if organic matter be present, the result is the formation of nitrates and the like, which combine with lime and produce deliquescent salts, viz., those which attract moisture. Then, however impervious to wet the walls, etc., may be, signs of dampness will be noticed wherever there is a humid atmosphere, and similar evils will result as if wet had penetrated from the exterior. Organic matter coming into contact with plaster, and even the exhalations from human beings and animals will in time produce similar effects; hence, stables, water-closets, and rooms which are frequently crowded with people, unless always properly ventilated, will show signs of dampness, and deterioration of the plaster-work; wall-paper will become detached from the walls, paint will blister, and peel off, and distemper will lose its virtue. To avoid similar mishaps, sea-sand, or other sand containing salt, should never be used either for plaster or mortar. In fact it is necessary that the materials for mortar should be as free from salts and organic matter as those used for plaster, because the injurious effects of their presence will be quickly communicated to the latter. Unfortunately, it is not alone by taking precaution against the possibility of having a damp house, that we necessarily insure a "sweet home." The watchful care of the architect is required, from the cutting of the first sod, until the finishing touches are put on the house. He must assure himself that all is done, and nothing left undone, which is likely to cause a nuisance, or worse still, jeopardize the health of the occupiers. Yet with all his care, and the employment of the best materials and apparatus at his command, complete success seems scarcely possible of attainment. We have all much to learn, many things must be accomplished and difficulties overcome, ere we can "rest and be thankful." It is impossible for the architect to attempt to solve all the problems which surround this question. He must in many cases employ such materials and such apparatus as can be obtained; nevertheless, it is his duty to test the value of such materials and apparatus as may be obtainable, and by his experience and scientific knowledge to determine which are best to be used under varying circumstances. But to pass on to other matters which mar the sweetness of home. With many, I hold, that the method usually employed for warming our dwellings is wasteful, dirty, and often injurious to health. The open fire, although cheerful in appearance, is justly condemned. It is wasteful because so small a percentage of the value of the fuel employed is utilized. It is dirty, because of the dust and soot which result therefrom. It is unhealthy, because of the cold draughts which in its simplest form are produced, and the stifling atmosphere which pervades the house when the products of imperfect combustion insist, as they often do, in not ascending the flues constructed for the express purpose of carrying them off; and even when they take the desired course they blacken and poison the external atmosphere with their presence. Some of the grates known as ventilating grates, dispose of one of the evils of the ordinary open fire, by reducing the amount of cold draught caused by the rush of air up the flues. This is effected, as you probably know, by admitting air direct from the outside of the house to the back of the grate where it is warmed, and then flows into the rooms to supply the place of that which is drawn up the chimneys. Provided such grates act properly, and are well put together so that there is no possibility of smoke being drawn into the fresh-air channels, and that the air to be warmed is drawn from a pure source, they may be used with much advantage; although by them we must not suppose perfection has been attained. The utilization of a far greater percentage of heat and the consumption of all smoke must be aimed at. It is a question if such can be accomplished by means of an open fire, and it is a difficult matter to devise a method suited in every respect to the warming of our dwellings which at the same time is equally cheering in appearance. So long as we are obliged to employ coal in its crude form for heating purposes, and are content with the waste and dirt of the open fire, we must be thankful for the cheer it gives in many a home where there are well-constructed grates and flues, and make the best use we can of the undoubted ventilating power it possesses. A constant change of air in every part of our dwellings is absolutely necessary that we may have a "sweet home," and the open fireplace with its flue materially helps to that end; but unless in every other respect the house is in a good sanitary condition the open fire only adds to the danger of residing in such a house, because it draws the impure air from other parts into our living-rooms, where it is respired. Closed stoves are useful in some places, such as entrance halls. They are more economical than the open fireplaces; but with them there is danger of the atmosphere, or rather, the minute particles of organic matter always floating in the air, becoming burnt and so charging the atmosphere with carbonic acid. The recently introduced slow-combustion stoves obviate this evil. It is possible to warm our houses without having separate fireplaces in each room — viz., by heated air, hot water, or steam; but there are many difficulties and some dangers in connection therewith which I can scarcely hope to see entirely overcome. In America steam has been employed with some success, and there is this advantage in its use: that it can be conveyed a considerable distance. It is therefore possible to have the furnace and boilers for its production quite away from the dwelling-houses and to heat several dwellings from one source, while at the same time it can be employed for cooking purposes. In steam, then, we have a useful agent, which might, with advantage, be more generally employed; but when either it or hot water be used for heating purposes, special and adequate means of ventilation must be employed. Gas-stoves are made in many forms, and in a few cases can be employed with advantage; but I believe they are more expensive than a coal fire, and it is most difficult to prevent the products of combustion finding their way into the dwellings. Gas is a useful agent in the kitchen for cooking purposes, but I never remember entering a house where it was so employed without at once detecting the unpleasant smell resulting. It is rare to find any special means for carrying off the injurious fumes, and without such I am sure gas cooking-stoves cannot be healthy adjuncts to our homes.

The next difficulty we have to deal with is artificial lighting. Whether we employ candle, oil-lamp or gas, we may be certain that the atmosphere of our rooms will become contaminated by the products of combustion, and health must suffer. In order that such may be obviated it must be an earnest hope that ere long such improvements will be made in electric light, so that it may become generally used in our homes, as well as in all public buildings. Gas has certainly proved itself a very useful and comparatively inexpensive illuminating power, but in many ways it contaminates the atmosphere, is injurious to health, and destructive to the furniture and fittings of our homes. Leakages from the mains impregnate the soil with poisonous matter, and it rarely happens that throughout a house there are no leakages. However small they may be, the air becomes tainted. It is almost impossible at times to detect the fault, or if detected, to make good without great injury to other work, in consequence of the difficulty there is in getting at the pipes, as they are generally embedded in plaster, etc. All gas-pipes should be laid in positions where they can be easily examined, and if necessary repaired without much trouble. In France it is compulsory that all gas-pipes be left exposed to view except where they must of necessity pass through the thickness of a wall or floor, and it would be a great benefit if such were required in this country. The cooking processes which necessarily go on often result in unpleasant odors pervading our homes. I cannot say they are immediately prejudicial to health; but if they are of daily or frequent occurrence, it is more than probable the volatile matters which are the cause of the odors become condensed upon walls, ceiling or furniture, and in time undergo putrefaction, and so not only mar the sweetness of home, but in addition affect the health of the inmates. Cooking-ranges should therefore be constructed so as to carry off the fumes of cooking, and kitchens must be well ventilated and so placed that the fumes cannot find their way into other parts of the dwelling. In some houses washing-day is an abomination. Steam and stife then permeate the building, and to say the least, banish sweetness and comfort from the home. It is a wonder that people will, year after year, put up with such a nuisance. If washing must be done at home, the architect may do something to lessen the evil by placing the wash-house in a suitable position disconnected from the living part of the house, or by properly ventilating it and providing a well-constructed boiler and furnace, and a flue for carrying off the steam. There is daily a considerable amount of refuse found in every home, from the kitchen, from the fire-grate, from the sweeping of rooms, etc., and as a rule this is day after day deposited in the ash-pit, which but too often is placed close to the house and left uncovered. If it were simply a receptacle for the ashes from the fire-grates, no harm would result; but as all kinds of organic matter are cast in, and often allowed to remain for weeks to rot and putrefy, it becomes a regular pest-box, and to it often may be traced sickness and death. It would be a wise sanitary measure if every constructed ash-pit were abolished. In place thereof I would substitute a galvanized-iron covered receptacle of but moderate size, mounted upon wheels, and it should be incumbent on the local authorities to empty the same every two or three days. Where there are gardens, all refuse is useful as manure, and a suitable place should be provided for it at the greatest distance from the dwellings. Until the very desirable reform I have just mentioned takes place, it would be well if refuse were burnt as soon as possible. With care this may be done in a close range, or even open fire, without any unpleasant smells, and certainly without injury to health. It must be much more wholesome to dispose of organic matter in that way while fresh than to have it rotting and festering under our very noses. A greater evil yet is the privy. In the country, where there is no complete system of drainage, it may be tolerated when placed at a distance from the house; but in a crowded neighborhood it is an abom-

ination, and, unless frequently emptied and kept scrupulously clean, cannot fail to be injurious to health. Where there is no system of drainage, cesspools must at times be used, but they should be avoided as much as possible. They should never be constructed near to dwellings, and must always be well ventilated. Care should be taken to make them water-tight, otherwise the foul matter may percolate through the ground, and is likely to contaminate the water-supply. In some old houses cesspools have been found actually under the living-rooms. I would here also condemn the placing of rain-water tanks under any portion of the dwelling-house, for many cases of sickness and death have been traced to the fact of sewage having found its way through, either by backing up the drains or by the ignorant laying of new into old drains. Earth-closets, if carefully attended to, often emptied, and the receptacles cleaned out, can be safely employed even within doors; but in towns it is difficult to dispose of the refuse, and there must necessarily be a system of drainage for the purpose of taking off the surface-water; it is therefore found more economical to carry away all drainage together, and the water-closet being but little trouble, and if properly looked after, more cleanly in appearance, it is generally preferred, notwithstanding the great risks which are daily run in consequence of the chance of sewer-gas finding an entrance into the house by its means. After all, it is scarcely fair to condemn outright the water-closet as the cause of so many of the ills to which flesh is subject. It is true that many water-closet apparatus are obviously defective in construction, and any architect or builder using such is to be condemned. The old pan-closet, for instance, should be banished. It is known to be defective, and yet I see it is still made, sold, and fixed in dwelling-houses, notwithstanding the fact that other closet-pans, far more simple and effective, can be obtained at less cost. The pan of the closet should be large, and ought to retain a layer of water at the bottom, which, with the refuse, should be swept out of the pan by the rush of water from the service-pipe. The outlet may be at the side, connected with a simple earthenware S-trap, with a ventilating outlet at the top, from which a pipe may be taken just through the wall. From the S-trap I prefer to take the soil-pipe immediately through the wall, and connect with a strong 4-inch iron pipe, carefully jointed, water-tight, and continued of the same size to above the tops of all windows. This pipe, at its foot, should be connected with a ventilating-trap, so that all air-connection is cut off between the house and the drains. All funnel-shaped water-closet pans are objectionable, because they are so liable to catch and retain the dirt. Wastes from baths, sinks and urinals should also be ventilated and disconnected from the drains as above, or else allowed to discharge above a gulley-trap. Excrement, etc., must be quickly removed from the premises if we are to have "sweet homes," and the water-closet is perhaps the most convenient apparatus, when properly constructed, which can be employed. By taking due precaution, no harm need be feared, or will result from its use, provided that the drains and sewers are rightly constructed and properly laid. It is then to the sewers, drains, and their connections our attention must be specially directed, for in the majority of cases they are the arch-offenders. The laying of main sewers has in most cases been entrusted to the civil engineer, yet it often happens architects are blamed, and unjustly so, for the defective work over which they had no control. When the main sewers are badly constructed, and, as a result, sewer-gas is generated and allowed to accumulate, ordinary precautions may be useless in preventing its entrance by some means or other to our homes, and special means and extra precautions must be adopted. But with well-constructed and properly-ventilated sewers, every architect and builder should be able to devise a suitable system of house-drainage, which need cause no fear of danger to health. The glazed stoneware pipe, now made of any convenient size and shape, is an excellent article with which to construct house-drains. The pipes should be selected, well burnt, well glazed, and free from twist. Too much care cannot be exercised in properly laying them. The trenches should be got out to proper falls, and unless the ground is hard and firm, the pipes should be laid upon a layer of concrete to prevent the chance of sinking. The jointing must be carefully made, and should be of cement or of well-tempered clay, care being taken to wipe away all projecting portions from the inside of the pipes. A clear passage-way is of the utmost importance. Foul drains are the result of badly-jointed and irregularly-laid pipes, wherein matter accumulates, which in time ferments and produces sewer-gas. The common system of laying drains with curved angles is not so good as laying them in straight lines from point to point, and at every angle inserting a man-hole or lamp-hole. This plan is now insisted upon by the Local Government Board for all public buildings erected under their authority. It might, with advantage, be adopted for all house-drains. Now, in consequence of the trouble and expense attending the opening up and examination of a drain, it may often happen that although defects are suspected or even known to exist, they are not remedied until illness or death are the result of neglect. But with drains laid in straight lines, from point to point, with man-holes or lamp-holes at the intersections, there is no reason why the whole system may not easily be examined at any time and stoppages quickly removed. The man-holes and lamp-holes may with advantage be used as means for ventilating the drains and also for flushing them. It is of importance that each house-drain should have a disconnecting trap just before it enters the main sewer. It is bad enough to be poisoned by neglecting the drainage to one's own property, but what if the poison be developed elsewhere, and by neglect permitted to find its way to us? Such will surely happen unless some effective means be employed for cutting off all air connection between the house-drains and the main sewer. I am firmly convinced that simply a smoky chimney or the discovery of a fault in drainage weighs far more, in the estimation of a client in forming his opinion of the ability of an architect, than the successful carrying out of an artistic design. By no means do I disparage a striving to attain artistic effectiveness, but to the study of the artistic, in domestic architecture at least, add a knowledge of sanitary science, and foster a habit of careful observation of causes and effects. Comfort is demanded in the home, and that cannot be secured unless dwellings are built and maintained with perfect sanitary arrangements and appliances.

CISTERNS.

A WRITER in the *Lumber World* presents some facts with reference to cisterns that may prove of interest to our readers.

Cisterns of various sorts and sizes may be very cheaply and speedily made. The largest sizes should be made oblong, not more than twelve feet across, to turn brick arch over conveniently, and as long as needed. Round cisterns are best when not more than twelve feet in diameter, and as deep as necessary, though the draft of water is rather hard when more than twenty feet deep, when pumped by hand. To build a cistern, if circular, the earth should be excavated in the shape of an egg, longest down, and rounding at the bottom, making the surface of the excavations as smooth and neat as possible. Three feet from the top dig out a shelf the width of a brick, laying the brick for the arch in cement or hydraulic lime-mortar of as good quality as can be procured. Lay a course of bricks in the mortar all round the shelf, pointing the spaces well between the bricks and behind them. When this is completed, all the spaces being filled up, begin another course about one and one-half inches out from the other, filling-in all pointing as before, so that the cement, when set hard, will bind and hold the course of bricks firmly. This will draw in the cistern three inches. Continue in this way until the hole is about the size of a flour barrel, filling-in the soil around the arch and above it, and building a neck about two feet high to finish off. The earth around ought to be fully a foot higher than the level, to turn off drainage and keep out surface water. When this is done the interior of the cistern may be plastered on the earth, when it is firm and solid, placing a large stone or platform of bricks immediately under where the water will fall, in the bottom, and to support the pump tube, if one is used. When an earth wall is not used, bricks should be laid in courses from the bottom, in cement, with much care, and backing each course well behind with dry sand, that the pressure of the water may not cause leaking, which is very often the case if not properly done.

Cement-mortar is usually made of two parts dry mortar-sand and one part of hydraulic cement. The bottom and walls of the cistern must be well plastered and completely covered with this mortar, without any breaks in it anywhere, at least one-half inch thick. It is best not to get it on too thick, or it may slide down to the bottom. This will dry enough in twenty-four hours to be well covered with a wash of hydraulic cement as thin as it can be laid on with a whitewash brush. The whole should be carefully gone over with this wash, that all porosities or cracks in the plaster may be thoroughly filled and covered up. Two or three coats of this wash are better than one, as they will render the cistern as tight as a bottle. The more coats of the wash that are put on the less the water will soak away through the pores of the plaster, and the tighter it will be. This is a point of considerable importance, and should always be carefully attended to.

It is, of course, convenient, when you decide how large a cistern is wanted, to know how large it ought to be made to hold the required quantity of water. For every foot of depth of the following diameters the cistern will hold: —

For	6 ft.	diameter	7.	barrels	of 30 gallons.
"	7 "	"	9.596	"	"
"	8 "	"	12.533	"	"
"	9 "	"	14.42	"	"
"	10 "	"	19.58	"	"

A cistern 10 feet deep and 6 feet in diameter holds 2,100 gallons, or 70 barrels of 30 gallons each. The rule for finding the contents of any cistern is to multiply half the diameter in feet by itself. Then multiply the product by 3.1416, which gives the area of the excavation near enough for practical purposes. Multiply this by the depth in feet, which gives the cubic contents in feet. Multiply the last product by 1,728 to get the number of cubic inches. Divide the whole result by 231, the number of cubic inches in a wine gallon, and the product will be the number of gallons in the cistern. This, divided by 30, gives the number of barrels of 30 gallons each.

In conducting water from a roof to a cistern, arrangements ought always to be made for turning it off when full, as the weight of the water is apt to burst the walls if it is allowed to overflow. This should always be carefully looked after, and the conductors ought always to be turned off until the rain has fallen for some time and washed the roofs clean and clear of leaves and other trash. A small wire screen ought also to be placed over the spout-holes in the roof. Professional cistern builders are apt to slight their work, using too little cement, or too little mortar, or not backing the walls well, or not washing them enough afterward to be tight. Any intelligent workman can make a good cistern after being shown how, and these often do the best work. It is always best to mix small quantities of mortar at a time, using it as rapidly as possible. A round cistern is much more economical of space, and holds more in proportion to depth of wall than a square one. But it is often thought best, in constructing very large reservoirs, to build them square. The following tables of both show the difference in wall and in area: —

SQUARE CISTERNS.

8 feet square	have	64 feet area	and	32 feet	of wall.
10 "	"	100 "	"	40 "	"
12 "	"	144 "	"	48 "	"

ROUND CISTERNS.

8 feet diameter	have	50 feet area	and	24 feet	of wall.
10 "	"	78 "	"	31 "	"
12 "	"	113 "	"	37 "	"

A 10-foot round cistern, it will be seen, has less wall than an 8-foot square one, and has 14 square feet more surface. Consequently, round cisterns are cheaper and larger than square ones, as well as stronger. In estimating the cost of a cistern the following details are useful. A brick is 8 inches long, 4 inches wide, and 2¼ thick. A wall need not be more than a brick thick, if carefully laid in cement and well backed with dry sand, so the pressure of water, when brought against it, cannot force it out of its place to cause a crack or a leak. When laid flat and lengthwise, seven bricks will make a square foot of wall. A 10-foot round cistern, 12 feet deep, will have 372 square feet of wall, and will require 2,600 bricks for a 4-inch flat wall, if the entire surface is laid upon bricks. But if only an arch is turned of bricks, and the cement-mortar is plastered on sound, solid clay earth, not more than 1,000 bricks will be needed. Sometimes a wall is laid up with bricks placed on edge, when about 1,700 will cover the entire area, walls, bottom, arch and all, but this is not a safe method unless a skilful workman attends to the job.

Mix the cement and sand dry before making mortar, as thoroughly as possible, placing the sand on planks, using it about an inch thick, then an inch of cement, and another inch of sand. Then mix and work thoroughly while dry. It is better to pass the whole through a screen, even if the sand has been already sifted. In wetting down, it is best not to mix more than a bucketful at a time. In plastering the walls always begin at the bottom, allowing each course to set and get hard before putting on another, or the whole may slide down in a lumpy mass.

UNDERGROUND WIRES.

SOME OF THE DIFFICULTIES ENCOUNTERED IN MAKING THEM WORK SATISFACTORILY.

STATUE OF WILLIAM PITT CHARLESTON, S.C.

THERE being at this time a popular demand that all telegraph and telephone wires shall be placed under the ground in cities, and some of the State Legislatures having the subject under consideration, it is of the utmost importance that no hasty or ill-advised action be taken that would result in impairing the telegraph service and seriously embarrass the business of the country. We would like to see all drays, wagons, street-cars, railroad-trains, and omnibuses as well as telegraph wires removed from the streets. If the question is asked, Can we do without them? the answer is, Certainly not. Can they all be placed under ground? Yes. Is it practicable to require them to vacate the streets within sixty days, or even two years? Is it practicable to place all the telegraph and telephone wires under the ground? I would like to answer yes; but let us candidly consider this question.

We are at first met with the assertion that the wires are placed underground in London, Paris, and other European cities; why cannot the same thing be done here? I answer that it can, although the difficulties to be encountered are much greater in American cities, but would Americans be content with such facilities as are enjoyed by Europeans? Let us see what the difference is. In London and Paris, for example, the telegraph wires are carried on poles to the railroad stations in the heart of the cities; from there they are carried underground to the main offices; branch offices throughout the cities have a system of pneumatic tubes for sending and receiving messages. It is only necessary, then, to provide a few trunk lines from the railroad stations to the central office and the system is complete.

Notwithstanding these cities have been experimenting with underground wires for twenty-five years, they are to-day stretching many of their telephone and local wires upon house-tops. Some of the trunk lines are underground, but to run wires underground to every building where a telephone is wanted has been found impracticable.

In Paris the sewers and catacombs form underground avenues, in which wires can be placed, rendering the problem an easy one to solve in that city.

In London large iron and stoneware pipes are placed under the pavements, through which wires can be drawn at pleasure. It is, therefore, unnecessary to dig up the streets in constructing or repairing the underground system.

Many of the finest cities of Europe have no underground wires.

Statistics one year ago showed that there were more telephone and private wires in the city of Cincinnati than in Great Britain and France combined. One reason for this is, that owing to the expense of constructing underground lines neither the Government nor private corporations can furnish them at rates which the public can afford to pay.

In the United States, a business-man wants in his office one or more telephone wires, American district wires, from two to six wires for reporting the market quotations, electric-light wires, etc. On the outside of his building he wants the fire-alarm wires, police wires, etc. In an adjoining room must be located a branch telegraph and telephone office. As an illustration there are fifteen telegraph offices alone upon one block in Cincinnati. Every hotel must have its telegraph, telephone, electric-light, fire-alarm, and gold-and-stock wires. This demand of business-men for facilities has resulted in the construction of a perfect net-work of wires over every city in the Union. Let the edict go forth that all these wires shall be placed underground, and nine-tenths of them will be abandoned. It will be a hard task for business-men to take a step backward for ten or fifteen years and deprive themselves of the conveniences they now enjoy.

In London branch offices in hotels and other public places are almost unknown. Gold-and-stock "tickers," fire-alarm, district, and police-telegraph systems have been looked upon as unnecessary "Yankee extravagances" that must not be imitated.

In the city of Brussels, one central telegraph office with branches at the railroad depots (which are reached by wires upon poles) constitutes the entire telegraphic equipment.

Other cities of 50,000 inhabitants have but a single office, and that at the depot. How long would Americans be satisfied with such facilities?

Our telegraph companies claim there has been no practical system of underground wires invented. Upon the other hand, we know that wires have been worked underground for years. Although there is an apparent contradiction, both statements are to a certain extent true. Wires can be worked underground, but they are very expensive to construct and maintain; so much so that the public could not afford to employ them as they do now. I venture the assertion that ninety per cent of the present wires in cities would be abandoned were the owners compelled to place them underground.

Another fact not generally known, is that a wire when buried in the ground has only one-fiftieth the capacity of one suspended in the air. In other words, signals can be sent with fifty times greater rapidity over the latter than the former.

There have been numerous and varied experiments made in the attempt to secure an underground system possessing the two essential qualities of reliability and cheapness. To be practical, it must be cheap enough to enable the public to employ it. Statistics show that in 1875 over 20,000 miles of underground lines in Great Britain, France, and Germany had been abandoned as useless. Since that time new systems have been invented. Some few are standing the test of time, while the great majority have long since failed.

The system adopted in London is considered the best in the world, but its cost prevents its adoption except for very short distances.

The English Postmaster-General stated in 1881, in the House of Commons, that the expense that would be incurred in substituting underground for overhead wires from London to the provinces would be so great that it would be out of the question to introduce the system. Although the British Government is the most powerful, financially, of any in the world, it cannot afford to connect its provinces by subterranean lines, yet its mileage of lines is not much greater than that of a single state like New York.

The Mutual Union Company one year ago put down an underground cable in the city of Chicago at an expense of $16,000, but never was able to work it.

The American Bell Telephone Company within the last few months put down a five-mile cable in Boston, but it has also proved a failure.

The Western Union Company, as will be seen by its annual report, paid $95,000 for an interest in an underground system, which is now being tested, but the results are very discouraging, as most of the tests have failed.

Many of the best electricians in the United States, who are not in the employ of any telephone or telegraph company, are free to admit that no system has yet been invented which is safe for any company

to adopt upon a large scale. The systems that have proved successful are too expensive for general use.

The City of Chicago has ordered all telegraph and telephone companies to place their wires underground, yet her police and fire-alarm wires still remain upon poles. If it is practicable to place them underground, why do not the large cities set the telegraph companies a good example by putting their own wires underground? American cities are so constructed that large tubes cannot be placed under the sidewalks, as is done in London. It will be necessary, therefore, to place them below the surface of the street.

A shrewd mathematician has calculated that when the wires are placed underground every prominent street in the large cities will be dug up on an average of once per week if the number of wires continue to increase in the same ratio as during the last five years.

Pneumatic tubes are too slow for the average American. As an illustration, the Western Union Company constructed three tubes between its main office in Chicago and the Board of Trade (the buildings being situated upon opposite sides of the street). The time required in sending a package through the tubes is about ten seconds, yet the telegraph company that attempts to handle its messages in that way cannot secure business. Nothing short of an office upon the floor of the Chamber, where a message can be handed to the person addressed the moment it is received, will satisfy the brokers. Facilities that were considered excellent three years ago are now denounced as an outrage upon the community.

Property-holders who are now demanding that the wires shall be removed from the streets and from their buildings, would be the first to complain should their demands be complied with. There is scarcely a prominent business block in any large American city that is not supplied with a number of wires. Compel the companies to put the wires underground, and the result will be only a few of the more important buildings will be supplied with wires; tenants cannot afford to provide them. The companies will not pay the expense, and the landlord will be compelled to do it at his own expense in order to secure tenants. Property-holders should beware lest they lay a snare that will number themselves among the first victims.

Let us make haste slowly in the war against the wires, and be sure we are right before we go ahead. —*"Pro Bono Publico" in the Cincinnati Commercial Gazette.*

CHURCH ARCHITECTURE.

EVINGTON, CAMPBELL CO., VA., March, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs,—Is there not a book on church architecture published? I want plans and specifications for a country church (Episcopal), and think I remember seeing advertised a cheap book of that kind.

Very truly yours, C. E. KIMBALL.

[F. C. Withers's "Church Architecture," to be obtained of Wm. T. Comstock, New York, price about $12, seems to be the nearest thing to what is wanted. We believe that this does not contain specifications, and we do not know of any work on the subject that has them. Micklethwaite's "Modern Parish Churches," price about $2, which J. Sabin & Sons, Nassau St., New York, will import to order, although it contains no plans, has innumerable excellent suggestions.—EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

THE COMPETITION FOR MECHANICS' HOUSES. — We desire to remind those who have studied this problem and intend to enter this competition that their drawings should be received at this office on or before Saturday next, April 21. Competitors who are not within easy reach of Boston will do well to ascertain from the expresses and postmasters the time usually consumed in transit between the two places, and then forward the drawings a day earlier to allow for unexpected delays.

AMERICAN SOCIETY OF CIVIL ENGINEERS. — The preliminary arrangements for the Convention were reported by the Secretary at the last meeting. The Convention is to be held at the cities of St. Paul and Minneapolis, Minn. The party will arrive at St. Paul about noon on June 19. Full details will soon be announced. It is intended also to arrange for a visit to the National Exposition of Railway Appliances at Chicago before proceeding to St. Paul..

DEADLY WELL-WATER. — A novel suit, which will test the responsibility of the Brooklyn city authorities to allow water in a pump well to become "stagnant, impure, poisonous, unclean and dangerous to human life and health," is pending trial in the Supreme Court of that city. The plaintiff is John Danaher, a resident of DeKalb avenue, who sues to recover $10,000 for the loss of his sons, Charles M., aged six years, and Thomas P. Danaher, eleven years, whose deaths were, it is alleged, caused by drinking impure water from a well near the plaintiff's residence The complainant alleges that the city has charge of the wells, and therefore should prohibit nuisances in them and preserve the public health. Health Commissioner Raymond has, within the last year and a half, condemned as dangerous to health the water of fifty wells, of which thirty have been closed by order of the Common Council. — *The Sanitarian.*

MORTAR FOR FIRE-PROOF WALLS. — In a recent number of *Stahl und Eisen* Herr Lürmann called attention to the unsuitable character of the mortar commonly used in the construction of walls built of fire-bricks. He remarks that such walls are often subjected to pressure from above, and are likewise constantly undergoing physical and chemical changes from the action of the heat to which they are exposed, and from the effects of the substances which are being burnt. He refers to the fact that the masonry is sometimes more or less disconnected, even before the construction which it forms is really in active use. In order that fire-proof walls may acquire the needful firmness to resist the effects of furnaces, etc., being heated and put into operation, the use of so-called fire-proof mortar is disapproved by Herr Lürmann, who suggests the employment of a mortar composed of lime, dolomite, cement, blast-furnace slag, glass, etc., with the addition of sand, clay, fire-brick dust, etc. This mortar in a finely-grained condition is mixed with water in such a way that the spaces between the bricks can be very small. It is asserted that this mortar ensures uniformity of extension during the action of heat, the masonry forming a solid mass and the loosening of bricks being entirely obviated, as well as the falling of mortar from the spaces between the bricks. The result of a high temperature is to render the union more binding between the mortar and the fire-bricks. Herr Lürmann remarks, however, that the fire-bricks must not in such cases exceed the normal dimensions, as bricks of too large a size are not well burned through, and by their want of uniformity allow of displacements in the interior of the masonry. The evenness in surface of fire-bricks of good quality makes the quantity of mortar but small in proportion to the entire mass of brickwork, the fire-resisting properties of which are not deteriorated, Herr Lürmann asserts, by the substitution of the mortar proposed by him for that commonly in use. — *The Builder.*

THE PLAN FOR DRAINING THE VALLEY OF THE CITY OF MEXICO.—The company formed for the purpose of draining the valley in which the city of Mexico lies, of which Commissioner of Agriculture Loring is president, has obtained an extension of time to the 26th of April, within which to deposit the $200,000 required as a guaranty by the Mexican Government. Señor Orazo, the federal engineer of the republic of Mexico, is now in New York in order that he may see that the interests of Mexico suffer no detriment in any agreement that may be made for the drainage of the valley. It is not generally known that the Spainards, after the conquest, undertook to drain this valley by cutting through the mountains around it. They made a cut 300 feet deep and several miles long by working 100 years. Señor Orazo thinks that the proper way to drain this valley is to deepen this at 65 feet. This will cost $4,000,000. He says that the suggestion that the mountains might be tunnelled is untenable. The water would destroy the tunnel, just as it did the tunnel that the Spainards made in the very act referred to. A number of prominent men, including several senators, are interested in Commissioner Loring's company, and it is believed that they will be able to raise the necessary funds. Plenty of men will snap at the concession if it drops from their hands. Its terms are very liberal. Money and land are to be granted the company that succeeds in draining the valley.— *Boston Herald.*

THE RUINS OF THE TUILERIES.— The area within and about the ruins of the Tuileries has now been entirely cleared of the mass of fallen débris with which it was encumbered, and the demolition of those parts of the buildings that still stand has been commenced during the past week. This work can proceed but slowly, owing to the precautions that have to be taken to preserve from injury those fragments possessing any artistic or historical value. The operations, which occupy sixty skilled workmen, have been started on the river front. The central pavilion will be attacked in a day or two. According to the unanimous testimony of those engaged in the demolition, the Palace is a marvel of defective construction. The masonry, with the exception of the facing-stones, consists of fillings only, and the interior, so generally admired, is found to be only a common moulding affixed to the rough stones, instead of being carved from the solid block, as every one supposed. It is rumored that an Anglo-American Company has purchased the Pavillon d'Honneur as it stands, with the intention of removing and reërecting it in the Crystal Palace Grounds at Sydenham, while the *torchères*(figures holding lamps)of the Salle des Maréchaux have certainly been bought by the Russian Government for the St. Petersburgh Museum.— *The Architect.*

HARDENING CONCRETE. — In a paper recently read before the Southend Mechanics' Institute, Mr. Henry Faija described his patented method of quickening the induration of concrete blocks. The concrete is made and rammed into the moulds in the usual manner, after which the moulds are placed in a chamber, which is maintained at a moist heat of about 100 deg. Fahr. This greatly increases the crystallization or setting of the cement, and allows the objects to be moved from the moulds in the course of a few hours. The concrete is then placed in a bath of about 110 deg. Fahr., composed of one part of silicate of soda, and twelve parts of water. The solution penetrates to the centre of the block, which is thus hardened throughout, instead of merely on the surface as in the usual process. In three or four days the blocks will have attained the strength of ordinary cement three or four months old.— *Engineering.*

THE PANTHEON, ROME.— Workmen are removing the two bell-towers which have disfigured the front of the Pantheon for two centuries and a half. These "*orecchioni*," — asses' ears — were erected by the famous architect Bernini in the pontificate of Urban VIII. *The St. James's Gazette* observes as a singular circumstance indicating perhaps that the architect was ashamed of his work, that the life of Bernini, by his son, though it goes into the minutest details makes no mention of the "*orecchioni.*"

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents herementioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

274,907. Kiln for Drying Bricks, etc. — Cyrus Chambers, Jr., Philadelphia, Pa.
274,910. Kiln for Drying Bricks, etc. — Harvey Cockell, Chicago, Ill.
274,912. Screw-Driver. — Martin B. Crawford, Terre Haute, Ind.
274,922. Circular Saw. — Chas. H. Douglas, Chicago, Ill.
274,926. Machine for Sawing Stone. — Andrew Folsom, Warren, R. I.
274,930. Reflector for Chandeliers, etc. — Isaac P. Frink, New York, N. Y.
274,948. Manufacture of Colored-Glass Windows. — John La Farge, New York, N. Y.
274,976. Fire-Shield. — Samuel Richards, Philadelphia, Pa.
274,977. Combined Portable Fire-Arrester and Fire-Escape. — Samuel Richards, Philadelphia, Pa.
274,985. Basement or Cellar Floor. — Ozias A. Smith, Atlanta, Ga.
274,988. Apparatus for Digging Wells. — Benjamin F. Stephens, Brooklyn, N. Y.
275,003. Elevator. — Chas. Whittier, Boston, Mass.
275,011. Combined Bathing Apparatus and Commode. — Quimby S. Backus, Winchendon, Mass.
275,017. Floor-Clamp. — Henry F. Case and A. Wells Case, South Manchester, Conn.
275,018. Fastener for Meeting-Rails of Sashes. — Ralph Chandler, U. S. Navy.
275,037. Elevator. — William Goddard, Chester, Ill.
275,051. Turning-Lathe. — Edgar H. Leland, East Templeton, Mass.
275,066. Lock for Sliding Doors. — William T. Mingus Newark, N. J.
275,079. Wrench. — Oscar E. H. N. Reichling, Marion, Ind.
275,080. Elevator. — Gustavus N. Reiff, Philadelphia, Pa.
275,083. Fire-Escape. — Henry J. H. Schuett, Detroit, Mich.
275,099. Self-Closing Faucet. — Thos. H. Walker, Kansas City, Mo.
275,106. Pipe-Wrench. — Henry B. Williams, Fremont Centre, Mich.
275,121. Fire-Escape. — David F. Black, Brooklyn, N. Y.
275,122. Wash-Stand. — William Blackwood, Jr., Detroit, Mich.
275,135. Fire-Escape Ladder. — Wesley C. Bush, Brooklyn, N. Y.
275,140. Latch for Sliding Doors. — Enos M. Clough, Lake Village, N. H.
275,151. Fire-Proof Ceiling. — August W. Cordes, New York, N. Y.
275,167. Shutter-Bower. — Jas. B. Dunwody, Jr., Walterborough, S. C.
275,179. Electric Elevator. — Stephen D. Field, New York, N. Y.
275,197. Fire-Escape. — William W. Griffin, Boston, Mass.
275,210. Hotel-Indicator. — Benjamin S. Hering, Cambridge, O.
275,223. Window-Sash. — Richard Langtry, St. Louis, Mo.
275,235. Screw-Driver. — Charles H. Mallett and Zachary T. Furbish, Augusta, Me.
274,300. Self-Closing Faucet. — Rodolphus L. Webb, New Britain, Conn.
275,327. Treating Water-Proofed Building Material. — Robert May Caffall, Philadelphia, Pa.

SUMMARY OF THE WEEK.

Baltimore.

Building Permits. — Since our last report forty-two permits have been granted, the more important of which are the following: —

Kerwan & Tyler, two-st'y brick building, n w cor. Spring Street and Hammond Alley.

Commercial & Farmers' National Bank, two-st'y brick banking-house, s w cor. German and Howard Sts.

Jos. H. Rieman, three-st'y brick building, e s Eutaw St., n of Lexington St.

W. F. Primrose, four-st'y brick warehouse, s s Clay St., between Howard and Park Sts.

Luther M. Reynolds, 2 two-st'y brick buildings, Half-Moon Alley, between Forrest and East Sts.

P. M. Quinn, three-st'y brick building, n w cor. Madison and Howard Sts.

John Hertel, three-st'y brick building, s w cor. Broadway and Joppa Road.

Wm. H. Shryock, two-st'y brick building, 25′ x 54′, s s Eastern Ave., between West Falls Ave. and Union Dock.

Mary E. Hartsock, 2 two-st'y brick buildings, e s Wilmer Alley, between Hoffman and Dolphin Sts.

Edward H. Webster, 15 two-st'y brick buildings, e s Wolfe St., between Chew and Eager Sts.

Henry Blake, 5 three-st'y brick buildings, e s Park Ave., between McMechin & Wilson Sts.

Martin Kenney, 6 two-st'y brick buildings, s s Nicholas St., between Decatur and Haubert Sts.

Boston.

Building Permits. — *Brick.* — *Olive Pl.*, Ward 17, for Peter Schell, stable, 27′ and 29′ x 27′, and 18′ x 18′, two-st'y flat; C. Blanchard, builder.

Boston & Providence Railroad Yard, Ward 22, for Boston & Providence Railroad Corporation, storehouse, 25′ x 30′, one-st'y flat; George F. Folsom, builder.

Newbury St., No. 149, *Dartmouth St., Nos.* 276 *and* 278, Ward 11, for Levi Tower, Jr., family hotel, 26′ x 80′, five-st'y mansard; B. F. Dewing, builder; W. G. Preston, architect.

Fayette St., No. 8, cor. Jefferson St., Ward 11, for Joseph Goddard, family hotel, 33′ and 36′ x 37′, four-st'y flat; James Fagin, builder.

Berkeley St., Nos. 30–42, *Appleton St., Nos.* 2–8, *and Gray St., Nos.* 1–7, Ward 11, for Boston Young Women's Christian Association, 75′ x 107′, five-st'y flat; Augustus Lothrop, builder.

Wood. — *Dickens St.*, cor. Adams St., Ward 24, for E. Frederick Pierce, dwell. and stores, 30′ x 24′ and 30′, and 20′ x 24′, two-st'y pitch; Wm. H. Gordon, builder.

River St., nearly opposite Temple St., Ward 24, for Chas. Brown, dwell., 14′ x 19′ and 14′ x 29′, two-st'y pitch; F. M. Severance, builder.

Unnamed St., near Clarence Pl., Ward 24, for Charles Reuter, dwell., 22′ and 27′ 6″ x 30′, and 16′ x 19′, two-st'y pitch; E. Shapleigh, builder.

Corinth St., near Salem St., Ward 23, for Thomas D. Mitchell, carriage-house, 20′ x 23′ and 20′ x 23′, one-st'y pitch.

Tufts St., Nos. 40–42, *Princeton St., No.* 42, Ward 3, for Mrs. Bridget McElvoy, dwell. and store, 19′ and 24′ x 36′, three-st'y flat; Edward J. Tully, builder.

Glen St., near Ashley Ave., Ward 1, for Geo. B. Green, dwell., 20′ x 68′, one-st'y pitch; Geo. B. Green, builder.

Glen St., near Ashley Ave., Ward 1, for Neil Beeton, dwell., 20′ x 38′; John C. Chapman, builder.

Brooklyn.

Building Permits. — *Madison St.*, n e cor. Nostrand Ave., four-st'y brick flat; cost, $12,000; owner, Thos. Ellison, Madison St., cor. Nostrand Ave.; architect and builder, C. B. Sheldon; mason, J. Auer.

Madison St., n s, 20′ e Nostrand Ave., 2 four-st'y brick double flats, felt and cement roofs; cost, each, $20,000; owner, architect and builder, same as last.

Fourth St., n w cor. Smith St., one-st'y brick factory, gravel roof; cost, $3,000; owner, architect and builder, H. J. Heath, 480½ Union St.

Greene Ave., n s, 55′ e Franklin Ave., 3 three-st'y brownstone front dwells., tin roofs; cost, each, $8,000; owner, architect and builder, J. H. Townsend, 60 Putnam Ave.

Monteith St., Nos. 45 *and* 47, 2 two-st'y frame tenements, tin roofs; cost, each, $3,000; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, T. Engelhardt.

Flushing Ave., s s, 175′ w Throop Ave., three-st'y frame store and double tenement, tin roof; cost, $5,600; owner, Joseph Bertina, 674 Flushing Ave.; architect, G. Hillenbrand; builders, V. Bruckhauser and J. Friesse.

Sixteenth St., 137′ w Fourth Ave., two-st'y brick school-house, tin roof; cost, $32,000; owners, Board of Education; architect, J. W. Naughton; builders, T. Kelly and Martin & Lee.

Pulaski St., n s, 125′ e Lewis Ave., three-st'y frame tenement, tin roof; cost, $4,200; owner, Hermann Scharmann, Hart St., cor. Stuyvesant Ave.; architect, T. Engelhardt; builders, A. Sachs and J. Rueger.

Varet St., s s, 175′ e Bushwick Ave., three-st'y frame double tenement, tin roof; cost, $4,200; owner, John Lachner, 186 Varet St.; architect, G. Hillenbrand; builders, J. Loerch and J. Rueger.

North Sixth St., No. 213, n s, 100′ w Sixth St., three-st'y frame double tenement, tin roof; cost, $4,500; owner, Frank Parks, Sixth St., cor. North Sixth St.; architect, T. Engelhardt; builders, U. Maurer.

Clinton Ave., w s, 251′ n Atlantic Ave., four-st'y brownstone front dwell., tin roof; cost, $18,000; owners, architects and builders, J. Doherty & Son, 280 Flatbush Ave.

Clinton Ave., 230′ n Atlantic Ave., three-st'y brownstone front dwell., tin roof; cost, $12,000; owner, etc., same as last.

Meserole Ave., s w cor. Newel St., three-st'y frame double tenement, gravel roof; cost, $4,200; owner, Jas. F. Burke, on premises; architect, F. Weber; builder, J. Fallon.

Dupont St., No. 131, n s, 100′ e Manhattan Ave., three-st'y frame double tenement, gravel roof; cost, $4,350; owner, Jno. White, on premises; architect, B. Lowe; builders, T. McHugh and J. A. Port.

Adams St., w s, 100′ n York St., three-st'y brick stable, gravel roof; cost, $6,300; owner, H. Wischman, 295 Raymond St.; architect, M. J. Morrill; builders, M. J. J. Reynolds and Morris & Selover.

Pacific St., n s, between Grand and Washington Aves., four-st'y brick double tenement; cost, about $7,000; owner, Peter Connelly, 926 Pacific St.; architect, I. D. Reynolds; builders, John & P. F. Burns.

Chicago.

Houses. — House for Wm. R. Linn, Old Dutch feeling, built of rough green serpentine stone, decorated with carved red terra-cotta, and having dark-red tile roof, 42′ x 80′, situated on Michigan Ave.; Burnham & Root, architects.

Five houses for Mr. Holbrook, at Evanston, averaging 25′ front, all in block, brick and timber, old Flemish feeling, two stories and basement; Burnham & Root, architects.

House of richly stained and decorated wood, for Geo. S. Lord, at Evanston, 44′ x 70′, with barn; Burnham & Root, architects.

House for Mr. Clingman, on Washington Boulevard, brick and timber, 30′ x 50′, decorated with color; Burnham & Root, architects.

House for Geo. Spofford, on Washington Boulevard, of green serpentine for basement and first st'y, with brick enriched arches, timber and stained shingles above, tile roof, 45′ x 80′; Burnham & Root, architects.

House for E. C. Waller, at River Forrest, Ill., of timber and shingles, colored in four tints, 45′ x 70′; Burnham & Root, architects.

House for H. Burnet, at St. Louis, of moulded bricks, cut shingles and tiles, also panels of stucco, two thicknesses cut through, 30′ x 60′; Burnham & Root, architects.

Memorial. — Armour Memorial, cor. Dearborn and Thirty-third Sts., 80′ x 130′, Chapel, Kindergarten & Manual Training School, brick and terra-cotta; Burnham & Root, architects.

Office-Building. — Office-building for Mortimer, Tupper & Grannis, on Lasalle St., ten-st'y, brick and terra-cotta, fire-proof, 50′ x 78′; Burnham & Root, architects.

Pavilion. — Pavilion and road-house for Garfield Park, wood, with stucco panels, cut through in two tints, 80′ x 120′, for West Park Commission; Burnham & Root, architects.

Building Permits. — John Vacholka, two-st'y brick dwell., 21′ x 58′, 772 Eighteenth St.; cost, $3,000.

H. S. McLean, 5 three-st'y stores and dwells., 20′ x 50′, Laflin and Van Buren Sts; cost, $15,000.

John Falkenberg, two-st'y brick dwell., 24′ x 50′, 133 Augusta St.; cost, $4,000.

O. S. Sumner, two-st'y brick dwell., 23′ x 60′, 2409 Prairie Ave.; cost, $5,000.

K. Mueller, two-st'y brick store and dwell., 22′ x 65′, 2509 Archer Ave.; cost, $5,600.

H. Beidler, two-st'y brick additional, 50′ x 100′, 46–50 North Morgan St.; cost, $3,500.

Louis Miller, brick additional st'y, 45′ x 73′, 727 Webster St.; cost, $3,000.

Jno. Gals, two-st'y shop and dwell., 24′ x 36′, 350 North Paulina St.; cost, $5,600.

B. H. Hayes, three-st'y brick stores and flats, 50′ x 60′, 745–747 Indiana St.; cost, $7,500.

S. H. Faile, 6 brick cottages, 20′ x 40′, Lowe Ave.; cost, $6,000.

Streeter & Tucker, two-st'y brick dwell., 22′ x 50′, 234 South Lincoln St.; cost, $5,500.

Louis Roeder, two-st'y basement and attic brick dwell., 25′ x 60′, 1019 Twelfth St.; cost, $5,000.

Alex. McIntosh, 2 three-st'y brick dwells., 50′ x 74′, 3144–3146 Wabash Ave.; cost, $16,000.

A. J. Lund, four-st'y brick store and dwell., 25′ x 70′, 105 Indiana St.; cost, $8,000.

Noyes & Galpin, 9 two-st'y brick dwells., 40′ x 167′, Selden St.; cost, $22,000.

O'Connell & McGinness, two-st'y brick dwell., 22′ x 60′, 653–655 Harrison St.; cost, $12,000.

A. Laufermann, three-st'y basement store and dwell., 22′ x 50′, 349 Division St.; cost, $5,500.

Joe Koster, three-st'y brick store and dwell., 27′ x 72′, 526 Van Buren St.; cost, $10,000.

J. F. Morris, two-st'y basement brick flats, 21′ x 44′, 115 North Division St.; cost, $3,000.

Louis Broberg, three-st'y basement brick flats, 22′ x 50′, 336 Franklyn St.; cost, $7,500.

W. H. Dillingham, 2 brick additional stores, 36′ x 80′, 101 to 103 Clark St.; cost, $15,000.

G. Merz, three-st'y basement brick dwell., 199 La Salle Ave.; cost, $10,000.

J. Tower, two-st'y brick dwell., 20′ x 50′, 310 Henry St.; cost, $3,000.

Ph. Weinheimer, two-st'y brick dwell., 22′ x 60′, 133 Taylor St.; cost, $4,000.

Chas. E. Culver, brick additional st'y, 80′ x 100′, 122 to 128 Michigan St.; cost, $4,000.

P. P. Connell, two-st'y brick store and dwell., 24′ x 60′, 748 Larrabee St.; cost, $4,000.

S. H. Gammon, two-st'y brick dwell., 24′ x 46′, 439 Dayton St.; cost, $3,000.

Mrs. M. Smith, two-st'y basement brick dwell., 21 x 44′, Plum St., near Loomis St.; cost, $3,000.

Jos. Klavacek, two-st'y basement brick dwell., 21′ x 54′, 84 Wilson St.; cost, $3,500.

G. L. Max, two-st'y brick flats, 22′ x 55′, 408 South Wood St.; cost, $7,000.

Matt Lestina, two-st'y brick dwell., 23′ x 50′, 989 Nineteenth St.; cost, $3,200.

J. Q. Adams, six-st'y basement brick store, 80′ x 171′, Congress St., cor. Wabash Ave.; cost, $100,000.

C. H. Martens, three-st'y brick dwell., 25′ x 69′, 538 West Van Buren St.; cost, $7,500.

John Kuhr, two-st'y brick dwell., 21′ x 48′, 30 Samuel St.; cost, $3,000.

C. E. Robinson, three-st'y brick dwell., 30′ x 45′, 527 and 529 South Clark St.; cost, $3,500.

Mrs. Susan Fitzhugh, two-st'y basement brick dwell., 23′ x 50′, 187 Winchester Ave.; cost, $4,000.

Reynolds Estate, 6 three-st'y brick dwells., 54′ x 100′, 574–582 Congress St.; cost, $25,000.

Theo. Bloun, two-st'y brick dwell., 21′ x 84′, 22 Grove St.; cost, $3,500.

A. O. Lindblad, three-st'y store and flats, 20′ x 60′, 47 East Chicago Ave.; cost, $7,500.

E. G. Lehmann, two-st'y brick barn, 28′ x 72′, 299–301 Michigan Ave.; cost, $7,000.

Wm. Krueger, two-st'y basement store and dwell., 24′ x 70′, 521–423 Blue Island Ave.; cost, $3,000.

Eli Thon, two-st'y basement brick dwell., 27′ x 50′, 34 Lemoyne St.; cost, $5,000.

Mrs. Mary Flynn, two-st'y brick dwell., 22′ x 46′, 316 Throop St.; cost, $3,500.

John Bock, two-st'y basement brick dwell., 21′ x 67′, 862 Twenty-first St.; cost, $3,200.

Peter Platt, two-st'y brick dwell. and store, 23′ x 86′, Thirty-ninth St., cor. Ashland Ave.; cost, $4,000.

Gorman & Costello, two-st'y brick flats, 40′ x 44′, 3841–3843 Wentworth Ave.; cost, $5,000.

J. Hunter, two-st'y brick dwell., 22′ x 32′; cost, $3,000.

H. Rumsfeld, three-st'y basement and attic brick flats, 49′ x 88′, 171 and 173 Sedgwick St.; cost, $20,000.

L. A. Slade, five-st'y basement brick warehouse, 64′ x 30′, 410 Canal St., to cost $26,000.

C. R. Hickock, 3 two-st'y brick dwells., 50′ x 61′, 3214 to 3218 Forest Ave.; cost, $6,000.

P. Stanton, two-st'y basement brick dwell., 22′ x 48′, 440 Thirty-first St.; cost, $3,400.

U. Melieha, two-st'y brick dwell, 21′ x 58′, 596 Throop St.; cost, $3,000.

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WE have this week to chronicle the collapse of no less than three buildings, with loss of life in two of the cases. The most fatal catastrophe occurred in Texas, where a three-story brick hotel, at Greenville, fell-in about midnight, crushing or burning to death thirteen persons. No explanation is given of the occurrence, and we must probably attribute it to the weakness of the structure. The next accident happened in Rochester, N. Y., and seems to furnish a valuable illustration of the danger of building heavy walls in cold weather. The building which fell was a five-story warehouse, twenty-two by one hundred and twenty feet, on the corner of State and Church Streets, which appears to have been in process of remodelling. A new brick wall had been built on the long side, which fronted on a street recently opened, and the foundation of this wall is said to have been of small stones, not well bonded, and laid in weather so cold that the mortar froze immediately after the stones were set in place. The first two feet of this wall was laid in "water lime," but for the rest ordinary lime was used. The sand for the mortar seems to have been of inferior quality, but whether it was clayey or loamy, or simply too fine, is not clear. The brick wall above the foundation must have been laid in cold weather, and was probably of rather inferior materials. The beams were simply laid into the party-wall, without anchors. With such construction it is not surprising that the warm weather of spring should have softened the mortar, which had been subjected to almost continuous freezing weather for five months, so that the wall, settling outward as walls do under such circumstances, and not being held to the adjoining building by the anchorage of the beams, pulled the upper timbers out of their bearing in the party-wall, allowing them to drop, and precipitating the ruin of the entire structure.

NO one but an expert can fully appreciate the dangerous character of a piece of construction like this, in which the three worst difficulties of ordinary practice were present at once, and seem not even to have been understood. Few problems give a well-trained architect or builder more anxiety than the erection of a long and narrow building upon a corner lot. The wall forming the long side is subjected to conditions far less favorable to stability than those affecting an ordinary party wall, which is held on each side by the beams of every floor, and should be built with special care, and made of sufficient thickness to stand safely almost without anchors, although it should be anchored at every opportunity to the neighboring walls. In the Rochester case all these requirements seem to have been violated. The exposed wall was of great length,— one hundred and twenty feet,—and probably at least sixty feet high; and so far as can be learned from the accounts, was not strengthened by any cross walls. Its thickness, then, for stability independent of any assistance from anchors, should be by Rondelet's rule, about four and one-half feet at the ground, diminishing by successive offsets to the top. If it had been strongly anchored to the party-wall, which, by the way, is a difficult matter in building alongside an old wall, this thickness might be somewhat diminished, but, as the evidence shows, there was no tie of any value, and the wall stood practically alone. Its thickness, however, instead of four and a half feet, was apparently less than half that, for we are told that the foundation, of small rubble, was only two and two-thirds feet thick. Again, the mortar of the wall was not only poor, but, as usually happens with masonry laid in cold weather, did not adhere to the bricks, which were taken from the ruins as clean as when they were laid; and for all practical purposes might as well have been replaced with sand, which would at least have had the advantage of not softening on one side in the sun and allowing the wall to bend over.

THE third collapse was in Chicago, and the account of it conveys a lesson of a different kind. The Champion Reaper Company of that city had just finished a large, five-story brick storehouse, and had placed some of its heavy machinery on the upper floors, when the wooden cap of one of the posts carrying the second floor, strained beyond endurance by the pressure, split, allowing the whole weight above it to drop; and the momentum acquired by the load in its movement of a few inches was sufficient to carry away everything beneath it, and throw the whole mass into the cellar, tearing out the walls at the same time. So far as appears from the description, the building, although cheap, was not unskilfully designed, and wooden posts with bolster caps, although not reliable under severe strain, are very commonly used in such cases. The failure seems to have come from the overloading of the floors with goods which probably neither architect nor owner thought would be stored there; and the moral to be drawn from the occurrence is that neither owners nor architects ought to take any chances in regard to such things, or allow the safety of their property or reputation to depend upon the resistance of a shaken piece of wood, or the discrimination of a porter.

TWO or three weeks ago the National Theatre in Berlin was destroyed by fire, fortunately without loss of life. There was no performance going on, and the metallic drop-curtain was down, but proved to be useless, the flames from the stage passing immediately around or through it, and setting fire to the proscenium boxes, and thence to the remainder of the auditorium. Up to the present time, the use of metallic curtains for keeping fires on the stages of theatres from spreading into the auditorium does not seem to have been very successful. Such curtains are heavy, noisy, and liable to stick in their grooves, or give trouble in other ways; and until better modes are devised for rendering the decorations of the stage incombustible, or of extinguishing them by automatic sprinklers if ignited, thin metal screens cannot be depended upon for anything more than the feeblest resistance to a fire.

THE misfortunes of the contractors for the Indiana State House seem to have culminated in an open breach between them and the State House Commissioners. The appeal of the contractors to the Legislature for an increase of the amount to be paid them, from sixteen hundred thousand dollars, the original contract price, to two million dollars, was rejected by the Legislature before its adjournment, and the Commissioners have therefore no alternative but to compel the performance of the agreement as it stands. Unfortunately for themselves, the contractors seem to have undertaken to resent the decision of the Legislature, and instead of carrying on their work vigorously, keep, it is said, only a few men in the building, with the intention of making a show of fulfilling their contract, which will give them a pretext for resisting in the courts the expected entry of the Commissioners for the purpose of resuming possession of the building. If they should really undertake to carry out such a plan, the skill of the Commissioners in drawing contracts will be tested, as well as their efficiency in supervising work. The prejudices of a jury would probably be all on the side of the contractors, and any obscurity of expression in the articles of agreement, or any doubtful circumstance in regard to the prosecution of the work, would be interpreted in their favor, so that a contract which proved to be clear and explicit enough to leave no possible question as to the intentions of the signers would reflect credit on those who

drew it, however unpleasant it might be for one of the parties to find themselves bound by it. It is suggested that the cancelling of the agreement with the present contractors, and the preparation of new agreements for the completion of the work, will cause much loss of time and money to the State; but the Commissioners are so familiar with the building that new estimates ought to be easily obtained and accepted, while the percentage reserved from the payments to the old contractors, which they will probably forfeit under their agreement, will serve as a margin to cover such increase in the prices of labor and materials as it may be necessary to provide for in the new contracts. The matter is, however, complicated by the failure of the Legislature before adjournment to give specific authority to the Commissioners for making further contracts, and it is doubtful whether it may not be necessary to suspend operations completely until it assembles again next winter.

A NUMBER of the older artists in New York have formed an association, to be called the American Art-Union, with the object of encouraging the fine arts in the United States, and for this purpose a kind of travelling exhibition has been organized, by which a collection of pictures is to be carried from city to city, under the direction of competent persons, who will display it in suitable places, and make sales when they can, at a commission of ten per cent, obtain new pictures to replace those sold, and return unsold pictures to their owners at the end of the season. The motive for the formation of the association is said to be the neglect with which the picture-dealers of New York treat the works of native artists, in comparison with those of foreigners, which are supposed to sell at a greater profit than the others. We wish we could say that the prospect of the development of the arts in America through this new association seemed to be very promising; but a peripatetic picture-show from which the best works are continually withdrawn by purchase would seem to be rather a meagre affair, and it is at least possible to imagine that such a body might work with a nobler impulse than the desire to get the better of the picture-dealers. With all respect for American artists, it is certain that the dealers would not be able to sell French and English pictures here at better prices than American unless their customers were willing to pay more for them; and the picture-buying public has become now sufficiently discriminating to take what it likes without much regard to advice as to what it ought, through patriotic or other motives, to prefer, or at least to purchase.

AN important work has been undertaken in Newport, R. I., for improving the bathing beach, which, although in itself clean and beautiful, terminates in an expanse of mud and marsh. This marshy ground is to be reclaimed, if the project is carried out, by dredging out the mud from the lowest portions, which are now exposed at low tide, and spreading it upon the higher parts, forming an embankment which can be covered with grass, and used as a promenade. The portion of Newport adjoining the beach is held by wealthy owners, including two land-companies, and the investment necessary for carrying out the scheme would probably be a profitable one.

AN interesting series of tests of structural materials is to be made at the Exposition of Railway Appliances, to be held in Chicago during the present season, and the managers solicit specimens of materialsfor trial. The various forms in which wrought iron and steel are commonly used are, in particular, to be submitted to thorough examination, and it is to be hoped that data will be obtained for calculation more reliable than those now in use. Among other things, an investigation is to be made into the effect of upsetting iron rods for bolts and ties, and a prize will be awarded to the manufacturer of the best rod of the kind. On this subject there is much diversity of opinion, the old idea, that the upsetting of a rod is advantageous, being now seriously called in question. The *Iron Age*, in inviting attention to this test, mentions that Professor Vose, of the Massachusetts Institute of Technology, once endeavored to collect information on the matter by asking the opinion of various bridge-builders and iron-workers; but received replies so conflicting that nothing of value could be deduced from them. For example, he was informed by a firm of iron manufacturers that the rods from their establishment were not injured in the least by upsetting; while an engineer, who obtained his bars from this very establishment, wrote that he found them so much injured by the upsetting that he had to have the ends cut off and new ones welded on.

THE definite track for the Panama Canal, after all the preparation of the last two years, has only just been marked out upon the belt of clearing which has been made across the Isthmus, but active preparations are in progress, and about eight thousand men are now engaged in excavating the great trench. It is said that so far about twenty-six millions of dollars have been spent on the work, but it is hoped that a hundred millions more will complete it. By the final route most of the trench will be less than fifty feet deep, but for about ten miles of the way the depth will range from one hundred to four hundred feet. Each foot of progress in such a cutting as this involves the removal of thirty-four hundred cubic yards of earth and rock, and the cost of a mile at this rate can be calculated by curious persons for themselves. Besides the excavation of the canal, there are many auxiliary works, such as the construction of the harbors at either end, the damming of the Chagres River, and so on, which will absorb a great deal of money. On the whole, the prospect seems to be that the cost of the work will exceed the estimates, but with energy and economy the amount available may perhaps be used to bring the canal so near completion that the remaining sum needed will be easily obtained.

ACCORDING to the Boston *Herald*, a modification has been made in the original plan for the Panama Canal, and instead of excavating the trench to the sea-level, so as to permit the towing of vessels directly through it, from sea to sea, the present plan contemplates eight, or perhaps ten, locks. This will reduce the cost of the work enormously, and with such modification the construction of the canal will be a comparatively easy matter. One consequence of the substitution of a less ambitious scheme for the hardly practicable project of a sea-level canal will probably be the silencing of the promoters of rival canals, who have made a good deal of capital out of the extravagant and impossible plan first contemplated. Although a canal with ten locks is a much less magnificent piece of engineering than one without them, it is, other things being equal, a better piece of property than one with twenty locks; and as the Panama route will be in any case the shortest and most quickly traversed, it is likely, if the rate of charge for tolls can be kept down by an economical construction, to have the preference over all others.

A GREAT advance has recently taken place in the price of stock in the Keely Motor Company, and preparations seem to be making for another display of the powers of the mysterious agent. A few days ago a notice was published inviting the stockholders to visit the workshops of the company in Philadelphia, "to view the progress made upon the new engine now in course of construction." The "engine" appears to be a locomotive, of which we have before had some description, but we are enabled to add, from the testimony of a visitor, that besides a steel shaft, ten feet long, and weighing fifteen hundred pounds, the machine is to comprise ten "vibrating tubes," weighing one hundred and fifty pounds each, and a "disc," weighing six hundred pounds. The "generator," in which the motive power is developed, is said to have been tested at a pressure of thirty-two thousand pounds to the square inch. How this pressure was obtained does not appear, but we learn that it has been actually measured by the gauge, so we must be content to believe without asking questions. No drawings have yet been made for the truck of the locomotive, but this would seem to be a detail of comparatively little importance, since a machine capable of exerting a force of thirteen hundred tons to the square foot hardly needs wheels to enable it to go over or through most geological formations known to science. The New York *Commercial Advertiser*, in a long article upon the subject, gives an illustration of the motor, together with an explanation of the principle upon which it depends. From this it appears that "vibrations are produced" in the interior of the machine "by the theory of interatomic ether acting upon molecular construction," and this "creates a disturbance of equilibrium so as to produce a pressure of one hundred tons to the square inch." How the interatomic ether is got at and set at work upon the molecular construction does not seem quite clear, but Mr. Keely explains that "the force is in the vacuum, because the power which is to be liberated is greater than the power behind it." In another place he adds that "Vibration is a difficult thing to define if we speak of it theoretically;" which leads us to suppose that he generally speaks of his machine theoretically.

WATER-CLOSETS.—IX.

TYLOR'S VALVE-CLOSET.—Two prominent English firms manufacture valve-closets in which the valve-chamber or receiver is formed in one piece with the trap, the combined trap or receiver being placed above the floor-level. J. Tylor & Son, London, claim the trap above the floor as a novelty in their valve-closet, which was invented in 1874, and improved in 1876-1878. The bowl is connected with the receiver by small set-screws. The space between the bowl and the flange is filled with putty or a cement of white and red

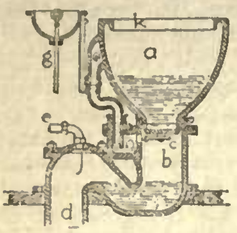


Fig. 85.—Section.

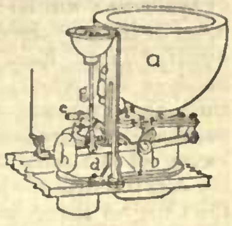


Fig. 86.—Perspective.

Tylor's Valve-Closets.

a, Bowl. *b*, Trap and receiver. *c*, Valve. *d*, Entrance to soil-pipe. *e*, Vent-pipe. *f*, Removable cover for hand-hole. *g*, Hand-pull. *h*, Weighted lever. *o*, Overflow.

lead or some similar composition. From the different illustrations it may be seen that this is a common mode of connecting the bowl and receiver. The receiver is made of galvanized, or, more properly speaking, zinc-coated iron, and the valve, when open, closes the mouth of the overflow trap, thus, the inventor claims, keeping filth from entering the overflow, and at the same time preventing siphon action from taking place. The trap has a small box cast on the part back of the valve, into which the overflow-pipe runs, and dipping below the water-line it forms a trap.

Fig. 87.
Detail of Valve.—Tylor's Closet.

a, Bowl. *b*, Receiver. *c*, Valve. *e*, Metal seat. *f*, Leather or rubber.

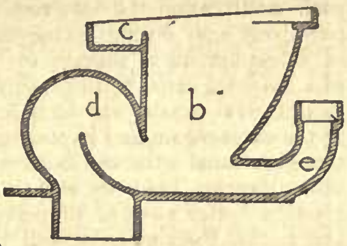


Fig. 88.
Improved Receiver.—Tylor's Closet.

b, Receiver. *c*, Box for overflow. *d*, Trap. *e*, Opening for bath or lavatory waste.

Tylor & Son manufacture several valve-closets which differ from each other only in unimportant details. They invented, in 1878, as an improvement on their old closet, an inlet into the receiver running below the water-line, for a bath-tub or lavatory waste-pipe. We have all probably had experience in the effect produced when a trap like this becomes accidentally stopped in any way, as this was a common mode of connecting the waste-pipes (it saved a trap) a few years ago in this country. A small number of plumbers still continue the bad practice.

In the closet under consideration the valve is very similar in construction to the Hellyer valve, a rubber or leather disc enclosed between an earthenware disc on top and a metal one beneath. The earthenware disc is the smallest, thus enabling the pliable disc to fit against a projecting metal seat. The traps of

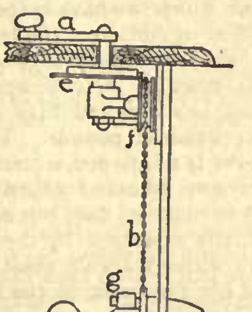


Fig. 90.

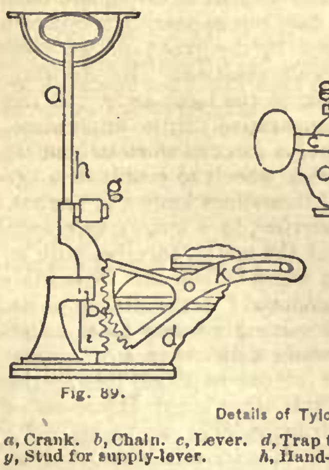


Fig. 89.

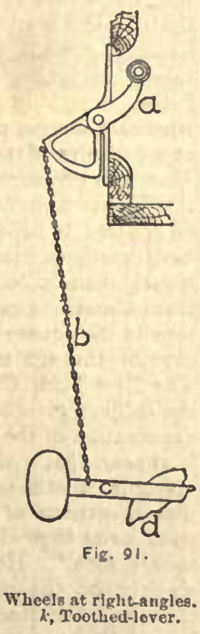


Fig. 91.

Details of Tylor's Valve-Closet.

a, Crank. *b*, Chain. *c*, Lever. *d*, Trap to closet. *e* and *f*, Wheels at right-angles. *g*, Stud for supply-lever. *h*, Hand-pull. *i*, Rack. *k*, Toothed-lever.

these closets have an inspection cover bolted to the trap, with a vent-pipe inserted into the crown; the vent is so very small as to be almost, if not quite, useless. There is no vent-pipe to the receiver. Tylor claims as his invention the three ways of opening the valve illustrated above. The first method was by forming a rack and pinion of the hand-pull and a segmental projection on the lever that opened the valve. The second method was by means of a crank placed in a horizontal position above the seat (see Fig. 90), as shown in the cut. This crank when turned imparts motion to a combination of wheels, on one of which is a drum upon which a small chain is wound (the drum is in a vertical position). In this manner the weighted lever is raised or lowered. The third method consists in simply attaching a chain to the lever and a bell-crank; any pressure on the crank would raise the lever.

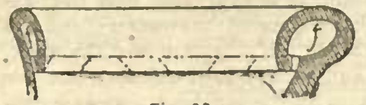


Fig. 92.
Flushing-Rim.—Tylor's Closet.

Doulton Lambeth Valve-Closet.—Doulton & Co., of England, manufacture a valve-closet in which the receiver or valve-compartment and trap are in one piece, and this piece is placed above the floor. This closet appears simple in its mechanism. The manner of trapping the overflow by introducing it into the main trap below the water-line is a novelty with this class of closets, and while it has the advantage of insuring a water-seal for the overflow, it is liable to become foul where it enters the trap. The receiver has an ample vent-pipe,

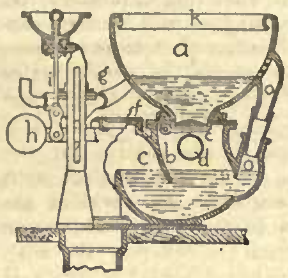


Fig. 93.—Section.

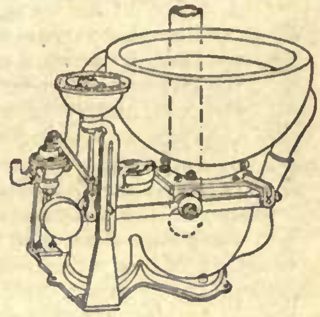


Fig. 94.—Perspective.

Doulton Lambeth Valve-Closet.

a, Bowl. *b*, *c*, Receiver and trap. *d*, Vent-pipe. *g*, Supply-pipe. *f*, Inspection-hole. *h*, Weighted Lever. *i*, Supply-valve. *k*, Flushing-rim. *o*, Overflow.

but the trap is not ventilated from the side where it is connected with the soil-pipe, as it should be. "The trap is provided with an opening for inspection, . . . which is secured with a patent cap ground into the opening, and so constructed that a slight turn one way or the other disengages or fixes it. . . . The valve has an earthenware facing and the interior of the trap is lined with strong, smooth glaze, perfectly impervious and incapable of corrosion," for these reasons offering the least resistance to water or soil passing through it, and at the same time insuring more perfect cleanliness. The trap is furnished so the bowl may be placed in front or on the right or left side, of the soil-pipe. In the perspective, the mode of attaching the Doulton patent supply-valve is shown.

DEDUCTIONS.

If it should be necessary at any time to select a valve-closet, one should be chosen with simple mechanism and few parts. The only closets of this class which appear to be practicable are those with hinged valves, the valve having either a rubber seat or disc, or both seat and disc of rubber. The time the valve will last without fixing depends on the durability of vulcanized rubber. The receiver should always be enamelled, earthenware being still better, as there is a possibility of the enamel being thrown off by corrosion or rust between the enamel and its iron back. The receiver should always be ventilated, as there will always be more or less offensive matter deposited on its sides; for this reason the smaller and smoother the receiver is the better. The vent-pipe in the receiver also keeps the overflow-trap from being siphoned by the water discharged from the bowl. This compartment should also be separately flushed, although I have no idea that a surface, no matter how well glazed or vitrified, over which fæcal matter, urine, and water in which these matters are floating in particles so finely divided as to be invisible, can be kept clean without the application of soap and water on a mop or swab by hand. I consider the variety in which the trap is above the floor, forming atthe same time the receiver, as the best arrangement for part of this the closet, but the advantage gained would not counterbalance lack of ventilation.

I consider the side-outlet valve-closet, in which the valve opens in an outward direction from the bowl, as the best of this class. The back of the valve never coming in contact with the waste matter, the only part of the closet between the bowl and the trap that could become foul and not be noticed would be the short pipe between the valve and the floor; while this would become more or less foul, it would be scoured as thoroughly as a column of water unaided could wash any surface; but a trap must be used below the floor. These closets are far superior to the pan-closets, of which I will give a description in the following pages, in their capacity for retaining a large amount of water in the bowl, and in the receiver being smaller; but they are defective in having a compartment, however small, between the bowl and trap when they have a trap, and the valves are liable to leak when least expected; then the advantage of the body of water in the bowl is lost. The overflow, unless filled by a driblet, will be emptied by

evaporation. It will have been noticed by the foregoing descriptions that the better closets of this class have a flushing-rim, by which the water is supplied to all parts of the bowl at the same time from a cistern. Where these closets have only a fan supplied from a supply-valve, the waste matter is liable to remain in the trap until the bowl has been emptied several times.

REBER'S HISTORY OF ANCIENT ART.[1]

PROFESSOR REBER has the gifts of condensation and presentation. We think of no book that covers the same ground as this which is, on the whole, so well adapted or so likely to be interesting to the general reader and to the student in his earlier progress. The most notable qualities of the book are its continuity and shapeliness, the skill with which the subject is kept in hand, and with which an amount of material that most writers would find it difficult to handle, is wrought into a consecutive whole. To these we must add scholarship, alertness of mind, suggestive thought, and an unusual power of compact and lucid statement, and we have enough to ensure that the book shall be attractive and stimulating, as well as instructive. It is, indeed, an historical essay or sketch, rather than a history. Professor Reber assumes the right of the essayist, and brings into strong relief such parts of his subject as he considers most significant, and passes lightly over intermediate tracts — the only treatment, in truth, by which a subject of so wide a range could be interestingly and serviceably discussed in a volume of this compass.

Greek art is made the central topic, and occupies nearly half the book, being naturally treated with more detail than any other part. Egypt is next to Greece (or rather to Hellas, used, in its broadest sense, to include all the Greek colonies). There is much skill in Prof. Reber's correlation of the branches of his subject, tracing the relation of one country's art to another's, and leading up to Greek from Egyptian, Oriental, Phœnician, and away from it to Etrurian and Roman. The reader may be surprised to find Lycia and Phrygia cast in with Phœnicia, but we think the treatment in the book justifies this. The scanty records of Phœnician and Etrurian art are made the most of; they are given the prominence which is legitimately due more to their intimate connection with the arts of Greece and Rome than to their own importance.

The hundred pages devoted to Greek architecture seem to us to contain the most interesting discussion and the best workmanship. The Doric temple is made its leading theme, as it may naturally be; the study of its development is followed with sufficient detail, with great acuteness and logical sequence, and with a vivacity that makes the account interesting. In the same way the threads of development in Egyptian architecture, and of its relation to Greek, are firmly held and clearly followed. On the other hand a very inadequate treatment, it seems to us, is given to Roman architecture, inferior indeed to Egyptian in force and majesty, to Greek in purity and all the finest artistic qualities, yet superior to both in intellectual power, in variety, scope, fulness of development, and influence on the world. But of this it is enough to say that Prof. Reber's point of view is distinctly Greek, with which we do not quarrel. For a title which should fairly characterize his book we might with fitness have: "An essay on Ancient Art, from a Hellenist's point of view."

The treatment of Greek sculpture and other sculpture is in the nature of things less satisfactory and less interesting, for the central clue is lacking, the lines of development less clear, the sequence more broken, the facts less patient of classification, and the amount of detail enormous. The subject is handled as well as it is easy to handle it in so small compass, and full advantage is taken, down to the date of the work, of late discoveries, *e. g.*, Schliemann's and Di Cesnola's researches, the excavations at Olympia and Pergamon. We may wonder whether Semper's empaistic theory is not pushed a little farther than it will bear, as is apt to happen to new theories; but it is so significant a theory, especially in the light of the discoveries at Mycenæ and Cyprus, that it deserves to be brought into prominence.

Any discussion of antique painting must unavoidably be unsatisfactory, if only for the opposite reason that its remains are so scanty — absolutely nothing, indeed, of the work of artists of importance, so far as is known. But this makes it the more singular that Prof. Reber, in a history of ancient art, should not have said a word, except incidentally, about Greek vases. One might read the volume through and hardly learn that a Greek had ever painted a vase; yet these vase-paintings are the only monumental record of Greek painting that we have, and, comparatively trivial and inferior though they are, while they can tell us nothing of the color, treatment, and quality of Greek pictures, they do give us, inferentially and collaterally, considerable knowledge of these subjects and development.

The book has the defects of its qualities. The author's generalizations are so neat, his way of putting them so clear and persuasive that opposing views have no chance. Even on questions on which controversy is keen, and the opinion of scholars of authority fully equal to Prof. Reber's differ altogether from his, or in matters in which, so far as we know, his opinion is exclusively his own, he is apt to write so that no reader unacquainted with the subject would dream that there was foundation or currency for any other view than his. Inferences and even conjectures which are ingenious and plausible, but not conclusive to an expert, sometimes in the nature of things or in the present state of knowledge not susceptible of determination, are set down as if they were ascertained facts or unquestioned deductions. This may be looked for when an author writes an avowed polemic; it is harmless in a book addressed to the learned; but in one which is intended or adapted for the amateur and the student, it is misleading, and a serious fault which ought to be noticed. It explains naturally enough why one may hear Prof. Reber challenged among his own countrymen as a *dilettante* and theorist. The first name seems misapplied — at least, we wish there were more *dilettanti* as learned and acute,— but the fault remains.

A case in point is the Vitruvian theory of the wooden origin of the Doric order, a theory which is on the whole pretty generally accepted, and will probably come to pass unchallenged. Nevertheless it is disputed both in Germany and France by men (Boetticher, Viollet-le-Duc) on whom Prof. Reber cannot look down. In this book, however, it is not only brought forward as unquestioned, but pushed much farther than by Vitruvius. He says, for instance, that the triglyphs were channelled boards covering the ends of the ceiling-beams. Prof. Reber adds that the mutules were also boards pinned on the under side of the sheathing, in which the rafter-ends were cased, to mark the position of the rafters. Moreover, the triglyphs were made of three narrow chamfered boards, whose edges, juxtaposed, gave the channels, while the tenia was a strip of board pinned to the lower edges of the triglyphs, to hold them together, and reinforced under them by additional strips which formed the regulæ. The so-called guttæ were the ends of the pins or treenails used to fasten the mutules, triglyphs and regulæ, and in the translation are accordingly called trunnels. All this is plausible, much of it likely enough; but it is not susceptible of proof, is denied by some scholars, and may be very wide of the truth, yet Prof. Reber asserts it all as if it were unquestioned knowledge. One is tempted to appeal from the author to himself, and quote the much more cautious remark with which, in his book on Architecture in Ancient Times (*Baukunst im Alterthum*) he closes his discussion of the same theory. There he says that he "would not make the Greeks' treatment of the Doric entablature subservient in all its details to their sense of primitive structural significance and relations, without allowing for a good share of caprice (*Willkür*), which always plays its part in ornamentation."

The hypæthral question is a stronger instance. This is one of the most vexed questions of Greek architecture, — has perhaps been more discussed than any other. The weight of opinion, however, has been decided in favor of accepting the simple statements of Vitruvius, that there was an opening by which light was admitted through the roofs of certain temples, and at variance only on the minor question how this was done.

Professor Reber gave a page of his German edition to a very positive assertion of the hypæthral doctrine, saying that "only by accepting the hypæthral temple can we come to a full appreciation of a Parthenon, or of an Olympian temple of Jupiter." Yet in the translation the whole question is suppressed; and the reader, who naturally scans the text to get an opinion on it, finds the hypæthron absolutely ignored. He discovers the assumption of the theory of which Ross has been the strongest supporter—and which Mr. Clarke, our translator, energetically maintains—only when he notices this subordinate clause of a foot-note: "While the existence of a so-called hypæthron . . . . is inadmissible from the point of view both of design and of structure." It will be noticed that nothing is said of the point of view of evidence. This is hardly a proper way to dispose of an important and conspicuous question, on which the balance of learned opinion is distinctly against Ross's theory. The title-page tells us that Mr. Clarke in translating has augmented the book, so that we cannot be sure how much is Prof. Reber and how much Mr. Clarke; but the translation claims to embody a revision by the author and has his approval, so we must assume that it gives his present opinions. If we turn to his *Baukunst im Alterthum* we find him saying "Thus arose the hypæthral temple whose existence, after Boetticher's irrefragable refutation (*unumstosslicher Widerlegung*) of Ross's objections, ought no longer to be questioned." It is phenomenal that a writer who within a short time has turned such a striking somersault should take up his new position with such immovable assurance.

These cases are enough for examples of what seems to us the chief fault of Prof. Reber's book, its air of absolute finality. The reader new to its subject will get abundant facts, admirably selected and coördinated, acute and interesting generalizations, suggestive remarks; but scarcely anywhere in the book will he find a hint that there is more to be learned anywhere, or that an opinion given is susceptible of modification. There is no citation of authorities worth mentioning, no attempt at bibliographical aid to the reader, nothing to show him how to advance a step from where the book leaves him. This is not of so much consequence to the general reader, who will be likely to content himself with a single book, and will probably not find another, at least in English, so good for his

[1] *History of Ancient Art*, by Dr. Franz von Reber, Director of the Bavarian Royal and State Galleries of Paintings, Professor in the University and Polytechnic of Munich. Revised by the author, translated and augmented by Joseph Thacher Clarke, with 310 illustrations and a Glossary of Technical Terms. New York: Harper & Brothers. 8vo., pp. 482.

purpose; but it is a serious matter for the young student, who needs finger-posts to set him on his way forward, and to whom it is an injustice to imprison him in prejudgments of questions which the world has not decided. It is difficult, certainly, in the midst of the enormous literature of to-day, and in a subject of so great range as Prof. Reber's, to make a satisfactory selection of authorities, but the difficulty of the task only makes it more important. The original edition was furnished with bibliographic lists which, if not unexceptionable, are very useful. The German edition is also furnished with a list of its illustrations, credited to their authors. Such an acknowledgment not only gives credit where it belongs, in a book whose illustrations are, with hardly an exception, borrowed, but it is full of very valuable suggestions for the reader. Here, nevertheless, there is no hint of it.

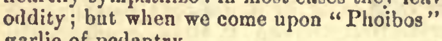
It remains to say a word of the translation. This we find, on turning to the original, to be free, even to paraphrase, and the freedom used seems generally to have been beneficial. We are struck, indeed, with the firm way in which the translator lays his hand on the essential thought of the author, and turns it into language of his own more compact than the original. The book has thus gained considerably in directness, and with the same text would be considerably shortened. Sometimes, indeed, there is loss of clearness, or completeness, by the condensation, as where (p. 16) the translation says: "The Proto-Doric columns originated from the mathematical duplication of the prismatic sides and angles of the square pier." Reber's remark was: "A purely mathematical idea underlay it—the duplication of the faces and angles by chamfering the corners of the square pier." The concision, moreover, is a little apt to change the moderation of the original into a dogmatism which is less agreeable. The matter of the book has been considerably increased in parts. The discussions of Greek architecture, and still more Greek sculpture, appear to have been much modified and enlarged: many new cuts have been added. The additions are germane, interesting, and valuable, and were needed to keep pace with the progress of archæological study since the book was written.

Mr. Clarke's enthusiasm for Greek words and forms is pronounced. Most readers will find something to forgive in terminology and spelling, and will be disturbed by such solecisms as "tore" for torus, "ogive" for pointed arch, "spirals" for volutes, "trunnels" for guttæ, the "kernel" of a capital instead of the bell; such a neologism as a "powerful" pier or cornice for a vigorous one; or such downright slips as "calyx" for corolla, or "cherubims," and "a cherubim." But this matter has a graver aspect than that of mere oddity of language when it comes to the deliberate intrusion, to please an individual whim, of new terms into a technical vocabulary which is already adequate, established, and understood. If every new writer on architecture feels himself at liberty to revise its terminology, the result will be confusion, and enormous increase of difficulty to students and readers. With the translator's fervor for the Greek spelling of classical names familiar in a Latin dress, we do not heartily sympathize: in most cases they leave only a little flavor of oddity; but when we come upon "Phoibos" we do seem to sniff the garlic of pedantry.

We should like to be able to praise the appearance of the volume. Its illustrations are many and graphic, but the reproductions are coarse. The whole embodies the prevailing faults of American book-making—assumption of an elegance that is not there, shiny paper, thick and stiff enough to be disagreeable in the hand, yet not opaque; a page too large for the sheet; excessive leading, which gives a loose-looking letter-press in unpleasant contrast to the narrow margin. The whole looks inferior, and unworthy of a book which, with all due allowance for the shortcomings we have mentioned, we should heartily commend to any reader of its subject as on the whole the best of its kind that we know.

THE LATE AMERICAN ARCHITECT COMPETITION.

REPORT OF THE JURY.—III.



"*Golden Gate's*" scheme is quite different from that of any other competitor, but his experiment is not a successful one. He has only a ground-floor and attic; this would naturally increase the area to be built over, and the additional cost of foundations and cellar would at once place him at a disadvantage from an economical point of view. As five chambers, a reception-room and "den," beside the dining and sitting rooms are provided, the total cost would figure up considerably above our limit, if the house should be properly built. While the exterior is not wanting in attractive features suitable for a seaside cottage, the interior is singularly unfortunately arranged. A long, narrow corridor six feet wide serves for a hall, and leads directly to the kitchen door, which is thus directly opposite the front door. This is both dreary and inconvenient, and the stairs to the attic ascending between closed walls adds to the discomfort. On the left hand of this corridor open two chambers and a bath-room — the latter had better have been placed so that it could have connected with the kitchen plumbing. On the side of the stairs are the reception, sitting, and dining rooms *en suite*, and "den," opening from the sitting-room. This generous communication is to be commended. There seems to have been no reason for omitting the fireplace in the dining-room, which could have been combined with that of the kitchen. The details are carefully drawn, but show inexperience; the detail of the kitchen porch is peculiarly childish; the hand-rail beside being absurdly heavy is chamfered on the upper side to a sharp ridge which would be most uncomfortable to the hand. The bracket of the mantel is also heavy. The design of the exterior and the perspective are better managed.

"*M*" has chosen — if we knew he lived far from the suburbs of any Eastern city, we should say, has designed — one of the types of economical and convenient plans with which we are already familiar. He has varied it, but not to the advantage of an all-the-year-round house, by making a very large hall: comfortable enough in summer, this would be difficult to heat in winter. There is nothing critical to be said of the convenient and commonplace disposition of the rooms below or above; but the omission of stairs to so prominent an attic as that shown on the elevations is a curious slip. Turning from the plans to the elevations we find again a familiar outline whose simplicity and economy we have already praised. It is not until we come to the details that we realize how wise it was of "*M*" to keep within the lines of recognized examples. It is difficult — and it certainly would be very unpleasant — to conceive of more vulgar details; and this chiefly because they are pretentious and tawdry, and affect an originality which neither the culture of the designer nor means at his disposal warrant. The front door is an inane affectation — costly and ugly. The carved panels show entire ignorance of the first principles of ornamental design, and their introduction is the more obnoxious in that no proper allowance is made in the estimate for the carved work liberally spotted about within and without the building, nor for the equally impertinent stucco panels. This pseudo-ornamental work materially increases the cost of a scheme already passing the limiting cost, and adds not a whit to its beauty. We commend to "*M*" greater modesty in his attempt to use ornamentation and the study of quiet unpretending buildings till he learn the beauty of fitness. Thus his item of $50 for stained glass is entirely out of place in a cottage such as the programme demands. The drawings were on the undesirable tracing-cloth.

"*Midnight Oil*," from the complete absence of all affectation presents a wholesome contrast to the preceding competitor. The plan is excellent, kept well within a rectangular parallelogram; not a foot is wasted. A good-sized vestibule leads to a hall which answers its purpose without waste; into it open dining and living rooms each with a fireplace. It is not evident why the small room opening out of the living-room should be called the "Music room," the most spacious instead of the most diminutive room being usually devoted to that purpose. The kitchen and pantry are well placed. Upstairs good square rooms are obtained and yet ample closet-room provided. Here again the servant's room would better be placed in the attic. The details within and without show studied simplicity, not pinching economy. Special praise must be given to the staircase, which is the most artistic and ingenious one shown in the competition. It is of very cheap construction yet most decorative in effect. As a whole this design is one of the best presented. Its chief defect is the commonplace design of the exterior; this is due partially to its hard, stiff drawing, which is much less prepossessing than the rendering of the staircase. The schedule of prices is one of the most likely to prove a satisfactory guide. There is a business-like air about this competitor's work which must commend it to practical-minded persons.

"*Comfort*" (No. 1) has one of the typical plans mentioned among the earlier criticisms, but what he has gained by an economical plan he has lavishly spent in other ways, so that it is probable that the brick lower story, with the heavy piazza piers of the same material, and the high basement would run up the total beyond our limit. Even according to "*Comfort's*" own estimate, the items, some of which are undervalued, figure up over $3,600. His economy in not providing bath or water-closet is misplaced, and his suggestion that the owner furnish the pump is not fairly meeting a legitimate expense. Seventy-two dollars for the painting is too low, and again $165 for mantels is over-generous. In many ways, however, the design is interesting. The châlet style is just enough suggested to be agreeable. The piazza from the second story is pretty and convenient, and worked with great simplicity. The chief defect in the design is the juxtaposition of two gables of different sizes. The mantel and book-case shown are good, but, as before suggested, beyond the means of the occupant of a cottage which has neither set-tub nor water-closet. The drawings are firm, sharp and reveal a practised hand. The perspective, on tracing-cloth, transgresses one of the rules of the competition. The jury in previous competitions have requested that the device or the *nom de plume* of each competitor be legibly and conspicuously placed upon the sheets, and as far as possible in a similar position on each sheet. Much time is lost sometimes by the jury in searching for the author's device, and it is but fair to warn competitors that such a search, if prolonged, is not conducive to a lenient spirit towards the drawings themselves. "*Comfort*" is printed in the smallest lettering, and then ingeniously hidden in a corner among some scrawling

leaves, instead of being the most conspicuous lettering on the sheet.

"*Argonauts*" shows a curious mingling of shrewdness and inexperience in his planning. His vestibule is built out under the porch in a puerile way and he has spoiled a spacious, airy hall by awkwardly cutting off the corner and has projected his fireplace so clumsily that it injures the room above. Parlor and dining-room open well together, but the chimney in the latter is placed against the outside wall when it might have done double duty if placed against the parlor wall. This same chimney comes out between the two windows of the chamber above, just where the toilet-table should stand. Careful study has been given to the stairs, and they are conveniently arranged. The bath-room is too much shut off from the principal part of the house, and the servant's-room would have found a better place in the attic by utilizing the ample space under the roof — which at present seems wasted. The exterior is injured by the unsightly corner chimney, and the way the roof is managed about it is ugly and impracticable, for a dangerous valley is formed by this superfluous gable. The amount of space covered, the frequent breaks in the plan and the three chimneys, wastefully distributed, make this an expensive scheme. The scanty economy suggested in the architect's commission, which does not cover superintendence, is an unworthy expedient to save money which elsewhere has been unnecessarily wasted. The details show excellent taste and a refined and sober feeling. The drawings lack simplicity and the short-hand, decisive touch which comes only with experience. "*Argonauts*" will do better things in the future, but he must beware of such illogical eccentricities as the cutting off of the corner of his hall. His specifications are in some items carefully made out, but they do not mention the bath-tub, and neither in them nor on the plan is there any indication of a water-closet, nor even of an earth-closet. The $100 allowed for plumbing should have fitted out the house fairly enough in this respect.

"*Benedick*" has boldly sacrificed his hall and reduced it to the merest passage, giving every inch possible to the living rooms. The dining and living rooms form a handsome suite and are well placed; not so, however, the library, whose entrance from the narrow hall is so close to the front door that it suggests a painful economy of space. There is a medium between the large halls belonging properly to spacious summer houses and the niggardly passageway with its straight flight of stairs seen so often in our narrow city houses. "*Benedick's*" error in the latter direction is the more striking since he has treated his exterior in a rustic way which has no hint of a narrow lot of land. The rounded end of the living-room is effective and gives distinction, but such treatment, it must be remembered, is the reverse of economical in construction. Fireplaces in every room are luxuries which our limit of cost will not countenance; but in general this house is simply and economically planned. The interior details are agreeable and well worked out and very skilfully drawn. We must assume that the settee in the hall is temporarily placed there for the benefit of the jury, as a hall which, including its stairs, measures only 6′ 6″, is hardly a resting-place. The drawings, as this proves, are "knowingly" presented.

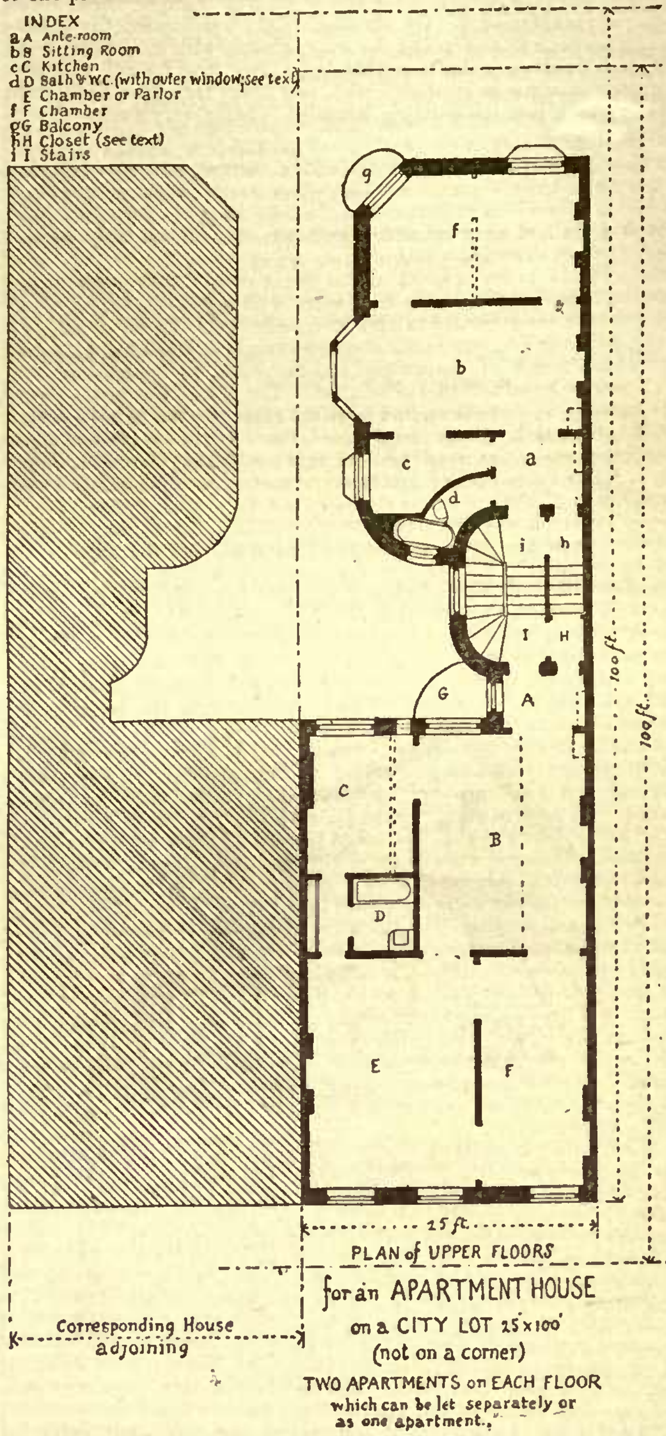
(*To be continued.*)

PLAN FOR AN APARTMENT-HOUSE.

IN the upper part of New York, many flats and apartment-houses are going up which have but little or no light and air in some or many of their rooms; with dark stairs; and from which escape in case of fire would be difficult or impossible.

The neighboring city of Philadelphia is largely composed of houses built also on deep, narrow lots, yet with light and air in abundance in every room, although, often, the number of rooms is greater on each floor. The Philadelphia plan readily lends itself to adaptation as an apartment-house, as for example in the plan herewith, or others, and such a house can readily be made exceptionally safe for escape in case of fire, for the staircase, though well lighted, is in a separate brick chamber.

To save room in the staircase, the rear apartment is on the level of the half-flight or landing of the stairs, but is connected by steps in the closets behind it, which can be used separately with the suites which they adjoin, or can be connected as a passage and the two apartments rented together as one suite of rooms. The bath-room, D, though it has a borrowed light, the upper part of the partition next the kitchen being of glass near the ceiling, yet has a wholly separate window and ventilation by means of a horizontal air-shaft, shown by dotted lines across the kitchen. The window at the end of the air-shaft is hinged, and can be opened and shut from the bath-room by a light wooden bar playing through the air-shaft; one end of it being attached to the window, and the other end projecting as a handle a convenient distance into the bath-room. As shown by other dotted lines, some of the rooms may be further sub-divided, if needed, and each of the rooms so made have their separate window; and this, whether such partitions are permanent or like those folding-door partitions in our old country hotel-parlors, which can be closed or left open, as temporary needs make desirable, either to make bedrooms of one at need, as shown in the rear apartment, or to make a temporary bedroom and passage of the sitting-room, as indicated by the dotted line across it. Such a building may either stand a few feet back from the street line, like most New York houses, or on the line; as further indicated by dotted lines. By a slight change in the planning of the stair-case the front and rear apartments can be planned to be built on a level. Such a stair-case, or one planned like that shown in the drawing, could be made of



iron, or with iron strings and stone treads, with more chance of being of use in case of fire than stairs built in the same way, but not enclosed by themselves, and so not shut off from fire in the rest of the house.

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR AN OFFICE-BUILDING ON BATTERY PLACE, NEW YORK, FACING THE PARK AND BAY, FOR CYRUS FIELD, ESQ. MR. CHARLES B. ATWOOD, ARCHITECT, NEW YORK, N. Y.

THE principal object in the planning of this building was to provide light and convenient quarters for the compositors on a daily paper which was to be published in the structure, with the presses located in the vaults under the sidewalk. A reference to the ninth-floor plan and the tranverse section will show the quarters provided for the compositors, and illustrate how, by means of wide terraces on the three sides of the building, and an almost unbroken expanse of window surface, except where light piers were needed to support the roof, ample and cheerful space was secured for the workmen. Naturally at this height the view of the Bay and distance would be magnificent, and the *ensemble* of terraces, gables, and pitched roofs, was planned with reference to the effect of the "sky line" when the building was viewed from the bay. Having a frontage on Battery Park, the mass of the structure would always be one

American Architect and Building News, Apr. 21. 1883. No. 382.

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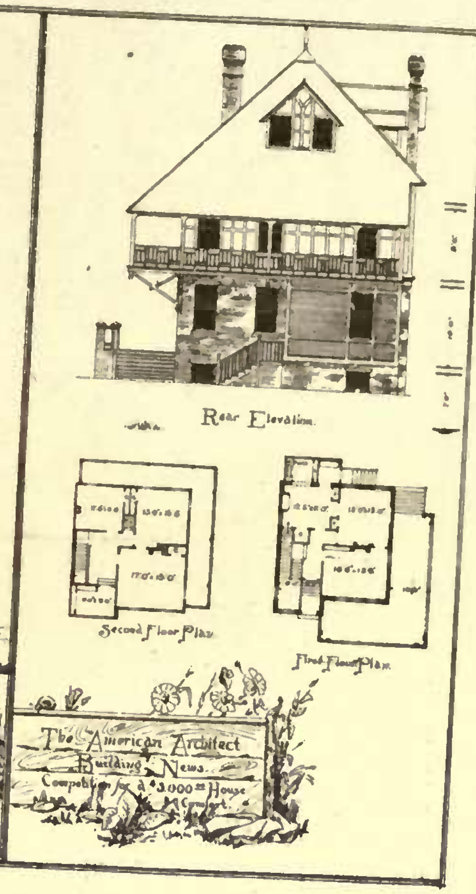

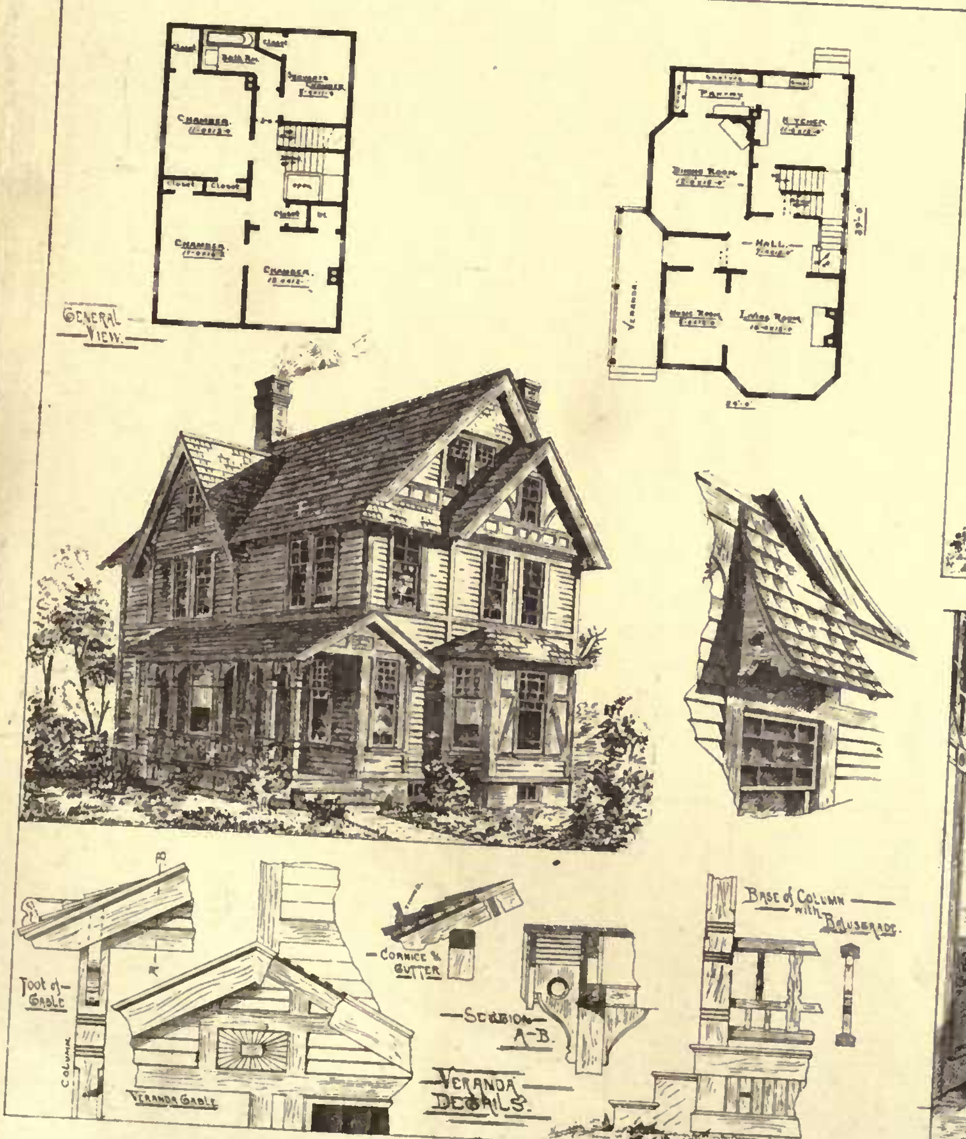

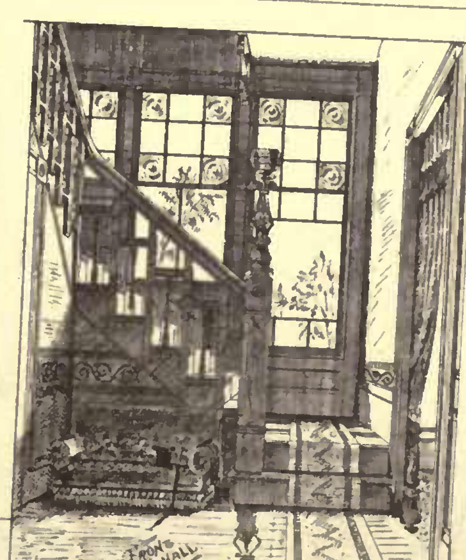

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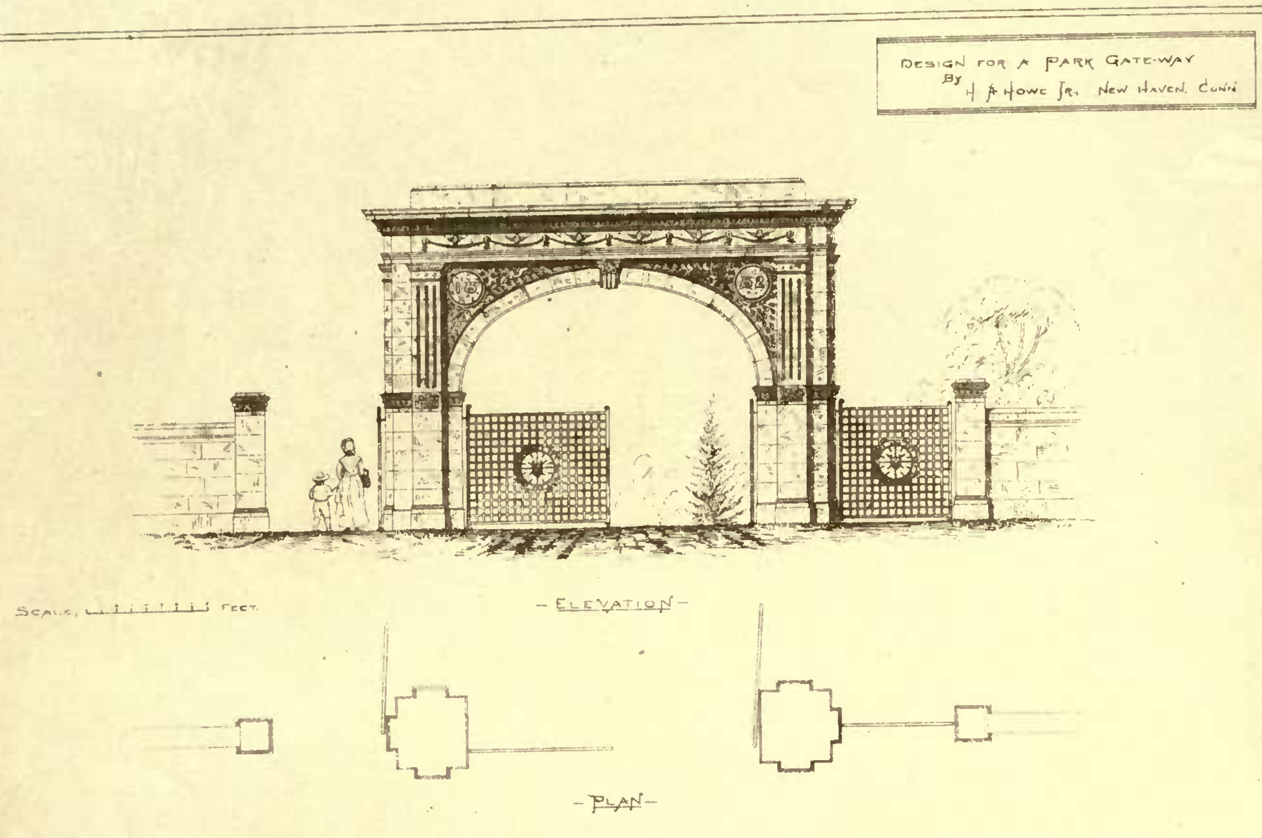
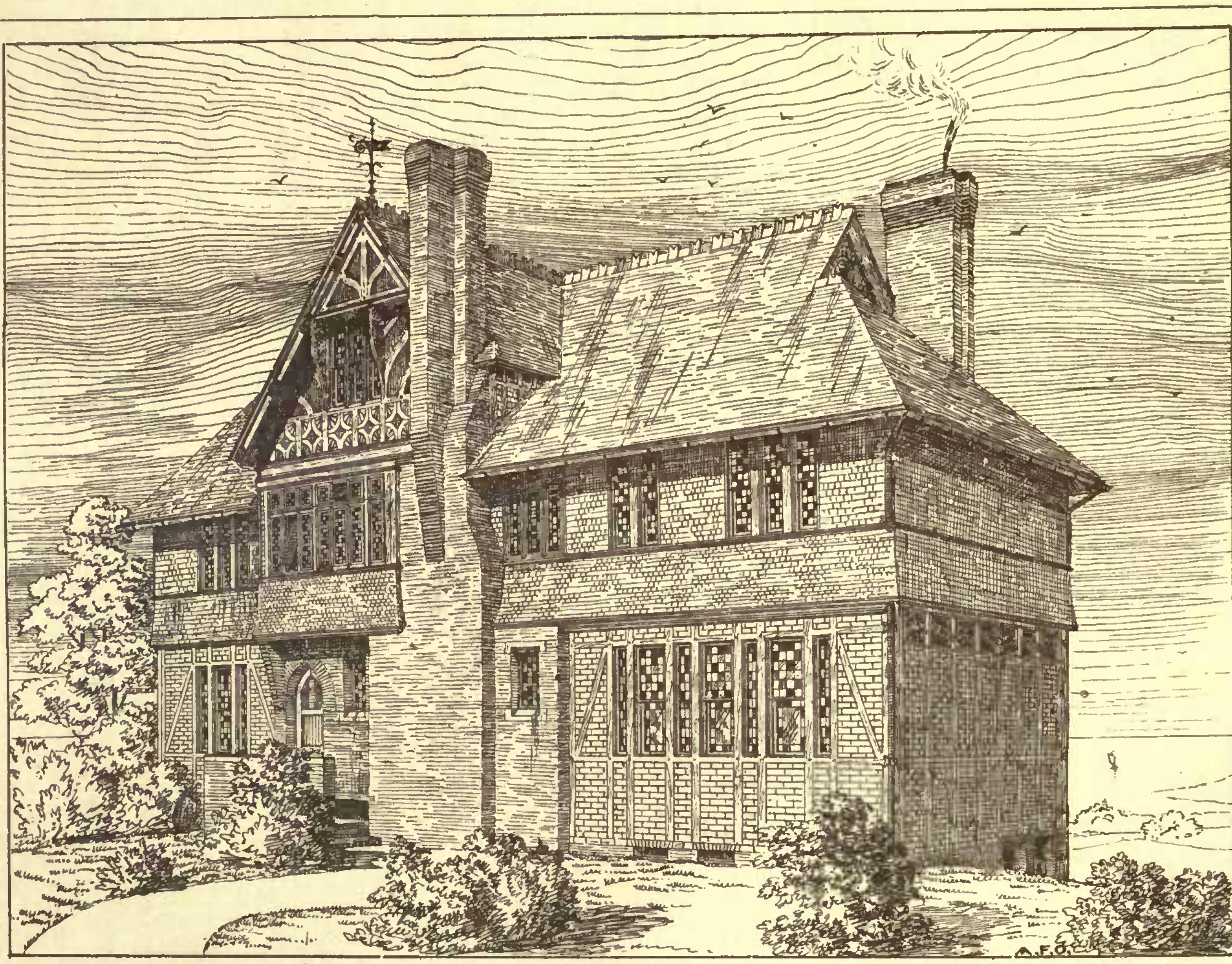
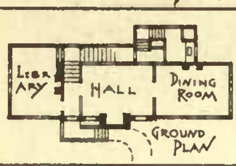
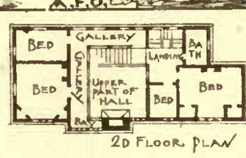






House in Everett Pl. Newport, R.I.
for J. Griffiths Masten Esq.
Alex. F. Oakey & Co. Architects, 4 W. 14th. St. N.Y.



Heliotype Printing Co. 211 Tremont St. Boston

AMERICAN ARCHITECT

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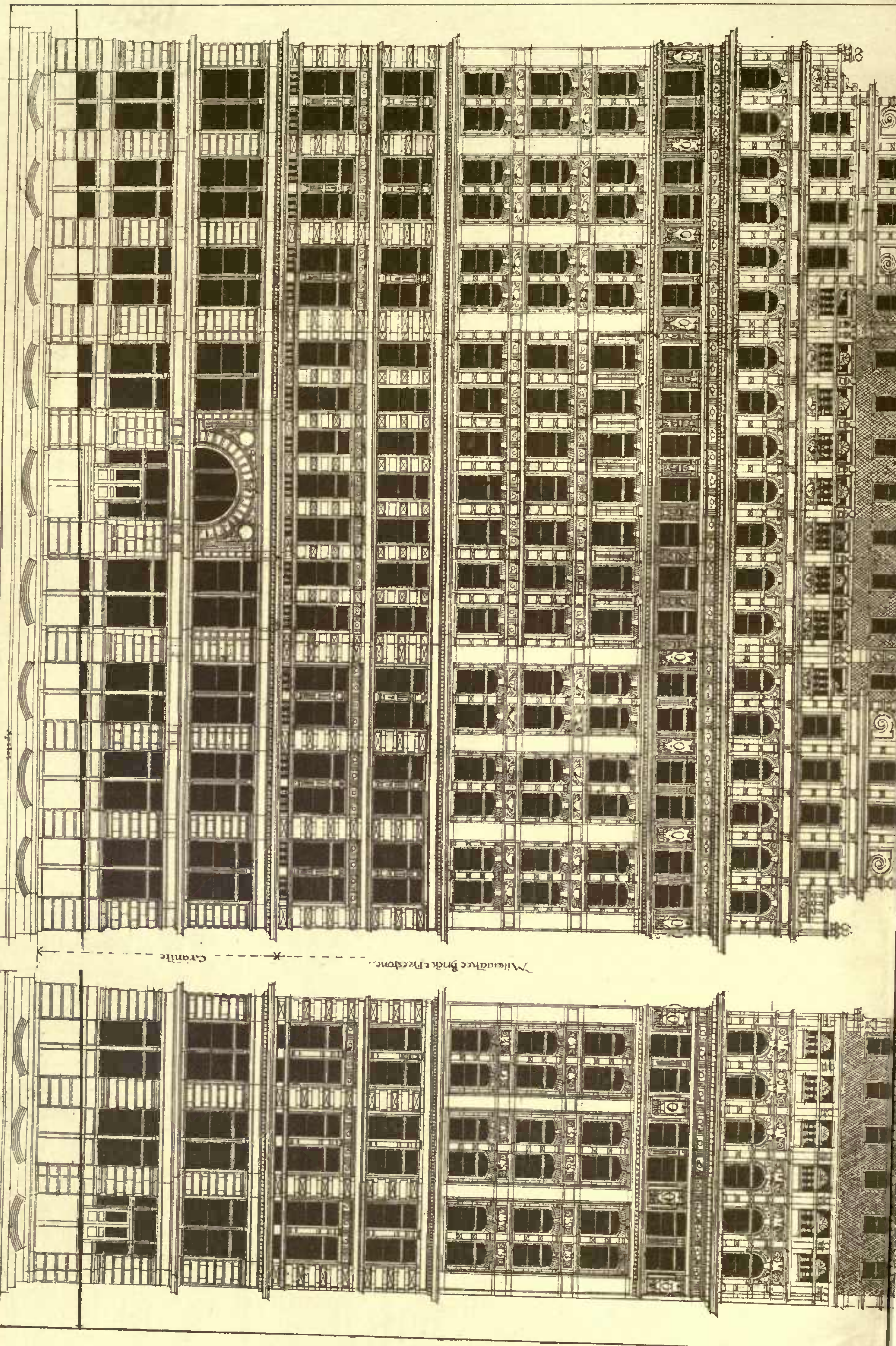
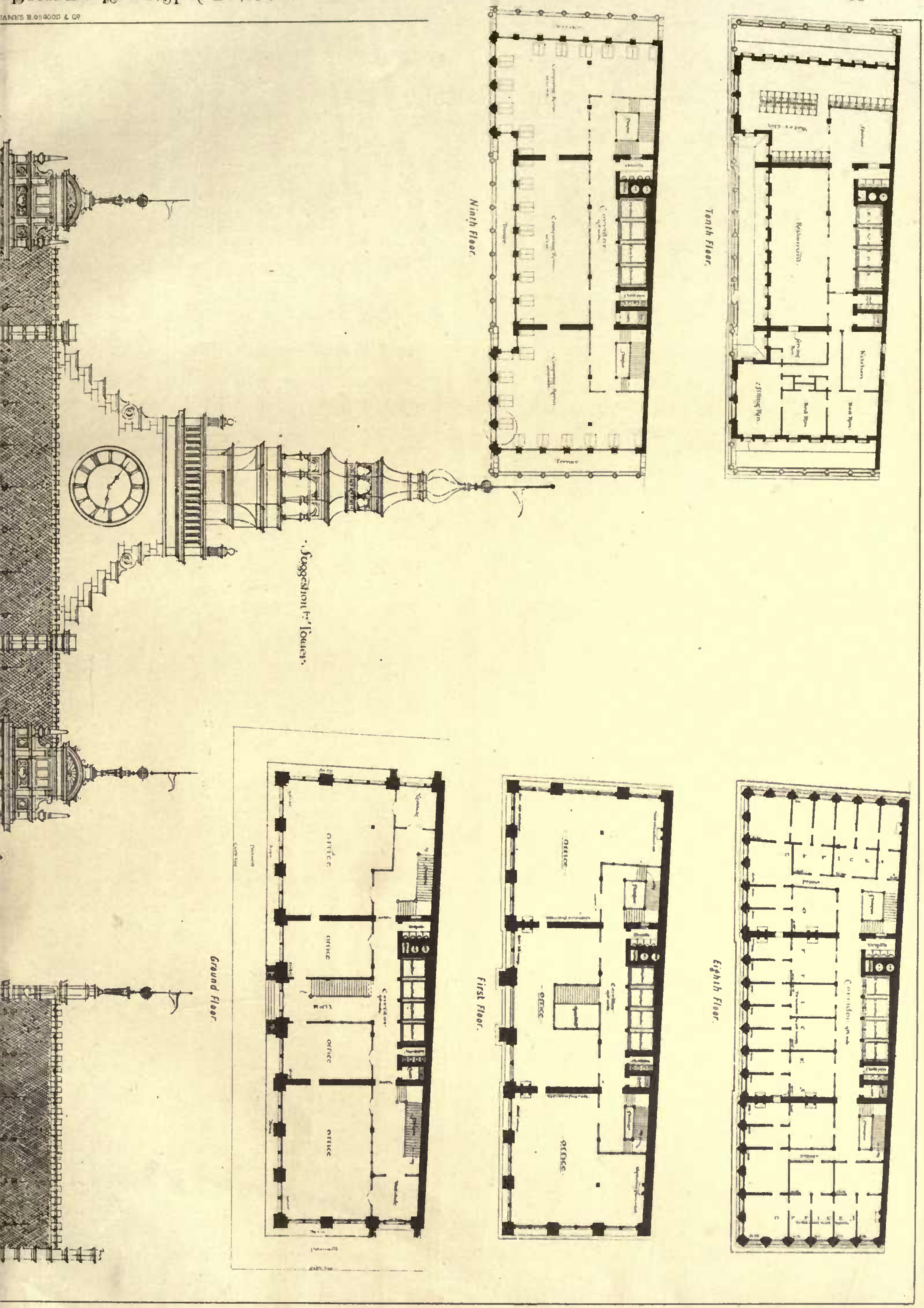


* Design for Office Building *
by
Chas B. Atwood, Archt.
New York

Heliotype Printing Co. 211 Tremont St. Boston.

James R. Osgood & Co.



of the most conspicuous objects to those who had their first view of it from the harbor. The construction of the building was so arranged that the partitions for offices could be changed about to suit the wants of tenants. On the tenth floor was located the restaurant, janitor's quarters, and the water-closets, with urinals on every floor. The elevator-shafts and the large brick flues for boilers, stand-pipes, etc., were so combined with two heavy tranverse brick walls as to strengthen the building laterally, it being very shallow for its great height.

PARK GATE, DESIGNED BY MR. H. A. HOWE, JR., NEW HAVEN, CONN.

HOUSE ON EVERETT PLACE, NEWPORT, R. I. MR. A. F. OAKEY, ARCHITECT, NEW YORK, N. Y.

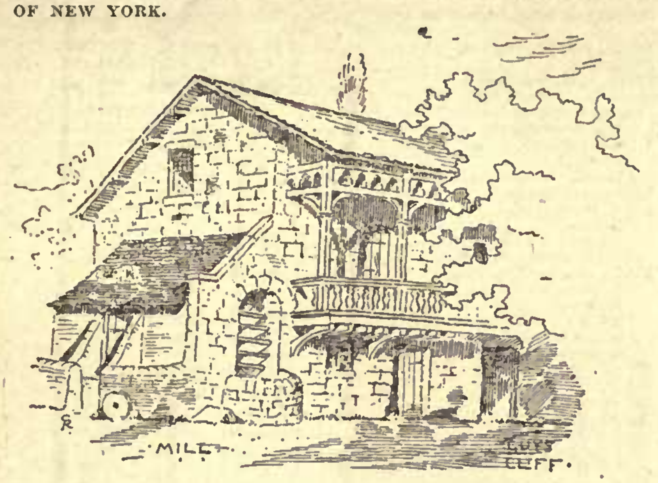
MATERIALS, red brick, timber, shingles (redwood); all external wood-work oiled and coach-varnished; red roof; terra-cotta cresting.

COMPETITIVE DESIGNS FOR A $3,000-HOUSE, SUBMITTED BY "*Midnight-Oil*" AND "*Comfort.*" (No. 1.)

SHOULD any of our non-professional readers desire to build according to either of these designs, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

THE NEW ARCHITECTURAL MUSEUM.

ACTION OF THE NEW YORK CHAPTER, AMERICAN INSTITUTE OF ARCHITECTS, IN RELATION TO THE LATE LEVI H. WILLARD'S BEQUEST TO FOUND AN ARCHITECTURAL MUSEUM IN THE CITY OF NEW YORK.



AT a regular meeting of the New York Chapter of the American Institute of Architects, held April 11, 1883, the Secretary read the will dated July 25, 1881, and codicil thereto, dated November 25, 1881, of the late Levi Hale Willard, Esq., bequeathing the bulk of his fortune to the Metropolitan Museum of Art (or in case of its refusal to accept, then to Columbia College), for the purpose of founding a museum of models, casts, photographs, engravings and other objects illustrative of the art and science of architecture, the collection to be made under the direction of a commission to be chosen by the N. Y. Chapter of the American Institute of Architects, one member of which it directs shall be Mr. Napoleon Le Brun, architect, of New York City. The members of this commission shall be the sole judges of the extent of the collection and the amount to be expended thereon, and if the bequest should, in their judgment, amount to a sum larger than will be required to fully carry out its provisions, then the remainder of the bequest, if any, may be employed in the purchase of landscape and *genre* pictures of the modern French school. Messrs. Alexander Holland of New York and Robert A. McKinney of Brooklyn, are the executors of the will.

The Secretary also read a posthumous letter (of even date with the codicil) from Mr. Willard to Mr. Le Brun stating his desire that to his son Pierre should be assigned the duty of making the collection under the direction of the Commission.

The following preambles and resolutions, offered by the Secretary, were then adopted:

Whereas, Mr. Napoleon Le Brun, Practising Member of this Chapter and Fellow of the Institute, has, by his able setting forth, seconded by his son Mr. Pierre L. Le Brun, of the claims of the Art of Architecture, been the direct means of securing to this Chapter the disposal of a large fund bequeathed by the late Levi Hale Willard, Esq., to found a museum of architecture, and

Whereas, prompt and hearty recognition is due to the origin of an event which, as the *American Architect* says, "seems likely to mark an era in the history of architecture in this country," as it certainly does in the history of the Institute and of its New York Chapter, therefore

Resolved, that the warmest thanks of this Chapter are eminently due to the Messrs. Le Brun, father and son, and are hereby tendered to them, and

Resolved, that an engrossed copy of these preambles and resolutions, signed by the President and Secretary of the Chapter, be presented to the Messrs. Le Brun.

Messrs. A. J. Bloor and Emlen T. Littell were then appointed the colleagues of Mr. Napoleon Le Brun on the Commission designated by Mr. Willard's will.

THE $3,000-HOUSE COMPETITION. — IX.

DIGEST of the specifications accompanying the design marked "*Midnight Oil*," with the figure of a lamp, thus:

Excavate so as to finish the cellar 7' in the clear.

Underpinning to show 2' above the grade-line, faced with split ashlar in irregular courses. Backing of 8" brick-work all laid in cement-mortar.

Foundation walls of sound, hard ledgestone, 16" thick, laid up dry, tied with frequent headers. The six inches of wall next below grade to be laid in cement-mortar.

Chimneys: — Foundations to be large flat stone laid so the brickwork will start at bottom of the cement-floor. Chimneys of good hard-burned, well-shaped brick. Fireplaces in the three rooms below as shown, arched over.

Rubbed bluestone shelf in the Kitchen and hearths of same for all fireplaces, turning arches. Breast in Kitchen, also jambs, to be faced with pressed-brick. Those in Living and Dining rooms to be faced inside of the mantels with buff pressed-brick, moulded, at the floor and spring of arch, pargetted. Tops of pressed-brick, forming panels with New Haven moulded brick. Iron funnels and stoppers for all rooms, two in cellar. Lead flashings built in to make tight work.

Slate hearths for Living and Dining rooms.

Outside Cellar Steps: — With bluestone treads and coping, brick risers and jambs, all laid in cement.

Bed-stone placed 3' below grade-line to receive the wood posts supporting the Veranda and Stoop, also for five posts in the cellar.

Ten bluestone sills for cellar windows.

Cement floor of cellar with 2" of cement and coarse gravel.

Drains of 4" vitrified drain-pipe. Have running trap with clean outlet. All inlets made with double-Y sections, to enter foundation walls where most convenient to receive wastes from wash-trays, water-closet, and sink; all joints made tight and the whole line to be well bedded. Roof-water also to empty into drain.

Lathing and Plastering: — All the walls and ceilings in the first and second stories to be lathed and plastered; clear sound spruce laths. Brown coat well-floated walls of Kitchen, Pantry, Bath-room and back stairway to be trowelled smooth for painting; all ceilings excepting closets to have a good hard clean coat of hard-finish, ceilings brush-polished, walls made smooth for papering.

Nothing is to be finished in the attic.

Grading: — Properly grade around the house.

A 3' 6" walk of packed gravel 12" thick, from street line to front entrance and around the house.

Carpenters Work: — Frame to be of balloon construction, of sound seasoned spruce: *Sills*, 4" x 6"; *Posts*, 4" x 6"; *Plates*, of two 2" x 4", spiked together with lapped joints; *Studs*, 2" x 4", 16" from centres, those at windows and door-jambs to be 3" x 4"; all angles of partitions made solid; *Floor* joists 2" x 8", 16" from centres, those for the attic floor to be 2" x 7", 22" from centres, *Rafters*, 2" x 7", 22" from centres; have ridge-pole 1¼" thick, collar-pieces of same, all floor joists to be bridged.

Floor joists double for trimmers and headers, also under all partitions running with them and having no other support, all thoroughly nailed to sills, plate and to every stud they touch. Partition-heads of 2" x 4"; upper studs must rest on these and not on floor boards, where possible.

Well brace and stiffen the work over bay-windows or other large openings.

To divide the bearing of the first floor-joists, five 8" x 8" chestnut posts will be set in the cellar, footing on stone.

Veranda floor framed with 5" x 5" sills and 2" x 6" joists. Post of chestnut set in the ground on stone, lower end to be charred or tarred. Rafters of pine, 2" x 5", planed, ends cut as shown on the details; plate, 4" x 4", cased and chamfered; columns built of 1¼" stock, chamfered, beaded neck and base; floor of 1¼" spruce, square edged, planed one side. Rafters to be covered with ⅞" matched and beaded spruce, in 4" widths, second quality; on this place ⅞" x 2" spruce strips, 2" apart.

All outside and inside finish where not otherwise specified to be of white-pine, second clears.

All roofs to be shingled with xxx 18" pine shingles, laid with three laps. Gutters as shown.

Sides to be brace-boarded with milled inch hemlock, clapboarded with second clears, laid 4" to 4½" to the weather; all outside finish to be 1¼" thick. Heavy tarred sheathing-paper under clapboards.

Single floors throughout of ⅞" spruce, in narrow widths, matched.

Window frames made of sizes indicated, 1¼" pulley styles, 1¾" sills, all for weights, braided cord and axle pulleys.

Sash 1½" thick, lipped, best American glass; stained glass in upper panel of the front door, stained bulls-eyes set in the Hall sash. Sash all fastened with a good sash-fast. Hinged top light over the back door.

Cellar sash 1½" thick, hinged and hooked, filled with good fair glass. Frames for these of pine, 2" x 4".

All glass to be single thick.

Doors: — First-story doors to be 1¾" thick, 2' 10" x 7' 6". Second-story doors to be second quality, 1½" thick, 2' 8" x 7', four panelled. Closet doors, 1¼" thick, 2" 4" wide. Outside doors, 1¾" thick.

Mortice-latch (knob) for all the closet doors. All other doors will have good mortice-locks, white porcelain knobs throughout, outside front door to have night-latch and brass bolt, back door to have iron bolt, brass face and striker for all main doors in the first story. Rubber-cushioned door-stop for all doors.

Architraves for the principal rooms (three) and hall below to be as shown by details; all others to be put on before plastering. Hard-wood thresholds.

Closets: — Shelve the Pantry; six drawers and one cupboard under. Glass casement at one end for china and glassware. Hanging-strips and hooks in all chamber closets; finish a closet leading from the Kitchen under the back stairs. Case with pine one water-closet having double lids; make and set

up a set of three wash-trays in the Laundry. Case up the sink with cupboard under.

Stairs: — 1¼" treads and ⅞" risers of pine for the front flight, the same of spruce for the back and attic flights. Rough plank stringers and 1½" treads no risers) for the cellar flight.

Rail, balusters and newel to be of cherry; balusters and cross-pieces to be cut with square ends and dowelled into place.

Cherry mantels for the Living and Dining Rooms.

Outside Blinds for all windows, in two folds of two panels each, swiveled slats 1⅛" thick, strongly hung and fastened at sill and clapboard.

Wainscot the kitchen 3' high.

Painting and Papering: — All inside and outside wood and metal work to receive two thorough coats of linseed-oil and white-lead, using two colors outside and one inside. Grain and varnish the Kitchen, Pantry, Bath-room and back stairway. The walls of the Kitchen, Pantry and back stairway to be sized and painted one good coat. Floors of Veranda painted; Prince's Metallic Paint for all metal work. Hard-wood of front stairs and the mantels to be filled, rubbed down and varnished; mantels finished with oil.

Paper all the walls not painted with paper averaging 25 cts. per single roll. Base and ceiling borders for the three main rooms and hall, first story, others to have ceiling-borders only.

No grates nor fireplace furnishings of any kind.

Plumbing and Tinning:—Furnish and set one 18" x 35" iron sink, with strainer; one Demarest water-closet, with lead safe and leaded slop-pan; no tub or basin to be used; 2" waste of iron for all fixtures, including the tubs in the Laundry; brass couplings at joints; traps well ventilated for each waste; 4" iron soil and 4" lead trap for water-closet, vented to roof; joints calked and leaded; supplies of ¾" A lead pipe for the main, ⅝" branches; cut-off at wall in the cellar; brass bibbs for sink and tubs, also one near water-closet for chamber supply; tubs to have plugs and chains; cold-water pipes only. Well tin the gutters with XX M. F. tin; four 3" tin conductors from the main roof and one 1½" leader from the veranda roof, the former to all enter the drain.

ESTIMATE OF QUANTITIES AND PRICES RULING AT BRIDGEPORT, CONN.

158	cu. yds. excavation,	$ 35.00	
38½	perch stone, foundation	113.00	
170	sq. ft. underpinning stone,	40.00	
7500	brick, body,	112.50	
1320	" face, Crotons,	36.96	
200	" buff,	15.50	
28	ft. 6" pipe, for drains, laid,	7.50	
108	" 4" " " " with Y's,	34.75	
100	sq. yds. cement floor,	28.50	
867	" plastering, brown,	216.75	
188	" hard finish,	18.80	
	Grading and seeding,	10.50	
2	slate hearths @ $6,00, and bluestone,	24.50	
10772	ft. b. m. spruce lumber, worked,	257.00	
2470	" hemlock siding, put on,	67.00	
1100	" spruce roof-strips and furrs,	22.50	
100	" " veranda ceiling, put on,	3.75	
250	" " frieze and rafter feet,	38.00	
540	" base, corners and bands,	24.50	
250	ft. cornice,	18.50	
90	" gutter moulding,	4.50	
2880	ft. b. m. spruce flooring, laid,	80.50	
1850	4' clapboards and labor,	115.75	
12800	shingles and labor,	99.50	
23	doors; frames, hardware and labor, complete,	238.50	
36	windows & blinds; frames, h'dw'e & labor, complete,	375.55	
10	" cellar,	20.00	
	Stairs,	95.00	
2	mantels, @ $25.00,	50.00	
	Outside labor and stock,	225.00	
	Inside " " for pantry and other fixtures,	125.00	
	Painting,	95.75	
150	rolls paper,	37.50	
	Paper-hanging,	20.00	
	Border,	6.25	
	Plumbing, tinning and gas-piping,	155.00	
	Architect's fee,	142.66	$2,995.97

DESIGN SUBMITTED BY "COMFORT." (NO. I.)

Excavation: —Excavate for a cellar under building, and a cistern of dimensions shown. Dig trenches for walls and piers 12" below cellar floor. Privy well, and drain trenches, to be dug where directed.

Foundations: — The foundations and piers will be laid with good, hard, well-burned brick, laid up to grade line in good cement-mortar. The cistern to be lined and paved with brick laid in cement-mortar, to be made thoroughly water-tight. Brick in privy well to be laid up dry, the rest of the brickwork to be of selected hard-burned brick, laid in good lime-mortar with neat joints. Chimney to be topped out with selects, and the flues to be thoroughly pargetted. Arches to be turned where indicated, to receive soapstone hearths.

Lumber and Carpenter Work:— All the framing to be of sound hemlock. First-floor joist, 3" x 10"; second-floor joist, 2" x 10"; posts, 4" x 6"; sill and plates, 3" x 4". Spacing of studding and joists to be 16", o. c. Sheathing of hemlock boards over the whole roof and pantry in rear of Kitchen. Sheathing on pantry will be covered with clear white-pine, weather-boards to show not more than 4½" to the weather. Roof to be covered with good cypress shingle.

Flooring to be of yellow-pine 1" thick, veranda floor being laid with narrow boards with white-lead in the joints. Joists to be bridged in the middle of bearings over 10' with lattice bridging. The flues and other openings to be framed with double trimmers where there is more than one tail-joist. The inside partition to be of 2" x 3", studding space 16", on centres, and stiffened with one row of horizontal bridging. Outside studding, 3" x 4", 16" on centres. Window-frames to be made for double-hung sashes, 1⅜" thick, all of clear white-pine with loose-axle pulleys, cord and weights. Inside rolling-slat shutters to all windows, those extending to floor to be 1⅜" thick, others 1¼" thick. Outside finish to be of white-pine.

Inside finish to be of spruce as follows: first-story architraves, 1" x 4", moulded; washboard, 6" x 1¼", moulded. Second-story architraves, 1" x 4", plain; washboard, 6" x ⅞", plain. Attic not to be finished.

Doors: — Outside doors to be 1⅜" thick, panelled and moulded; all other doors, 1⅜", thick panelled and moulded. All of well-seasoned pine.

Wainscot: — Kitchen, Pantry, Hall, and Linen-room, to be wainscoted and capped to height of 3½' with narrow, matched and beaded yellow-pine. A press to be fitted up in Linen-room with drawers and shelves. Pantry to have shelves, drawers, and lockers. All closets to have shelves and pin-rails. Stops to be fixed for all doors.

Stairs:—Carriages of stairs to be 3" x 12", hemlock. To have ⅞" risers, 1¼" treads and rails, balusters, etc., all of yellow-pine as per details. Privy to be built over well where directed.

Mantels: —Mantel and book-shelves in Parlor as per details. Mantel in Dining-room to be of spruce, not to exceed in cost $40. Neat shelves to be fitted up in all the bedrooms.

Hardware: — The hardware to be of the best American manufacture. Front door to have 5" mortice-lock, with bronze knob and furniture, night-latch, etc., and bronze bell-pull to bell in Kitchen connected with copper wire. All other doors to have 4" mortice-locks and porcelain furniture. Closet doors to have closet locks and keys. Back doors to have 8" bolts. First-story windows to have spring sash-locks. Dresser doors to have spring catches. Shutters to have flat bolts, and hung on cast-iron hinges. All doors to be hung on cast-iron loose butts, except front door, which will be bronzed. Closets to have a suitable number of japanned pins.

Plastering:—Plastering to be good three-coat work, on sound lath, and left hard, white, and perfect on the completion of the building. Outside of building from second-floor joist, to be covered with plaster composed of two parts clean sand and one part Portland cement, on good sound laths as per details. The whole to be pebble-dashed.

Roofing:—The roofs are to be sheathed with 1" hemlock boards and covered with cypress shingles, laid on one thickness of roofing-felt and painted one heavy coat before laying. Valleys, gutters and flashings to be of best quality I. C. charcoal tin, painted on both sides and finished with an additional coat on top. Conductors to be 3" diameter, with turn-outs at base. Galvanized-iron finial and saddles.

Painting and Glazing:—All exterior and interior wood-work to receive three coats best white-lead and linseed-oil paint, and to be finished in such tints as may be directed. The shingles to be painted with one heavy coat before putting on, and two additional coats of such tint as may be selected.

Glazing to be of best American glass left perfect on completion of building.

Plumbing and Gas-fitting:—Drive a 1½" pipe to the depth required to obtain a free flow of water, connect with pump in Pantry. Pump to be furnished by owner. Also furnish and set up a 2' x 3' slop-sink in the same room, with necessary connections to the drains. Furnish and lay all the 4" cast-iron and terra-cotta drain-pipes shown on plan. Run the required gas-pipe as shown on plans.

Heaters:—Two Latrobe or Baltimore heaters to be placed in Parlor and Dining-room, with hot-air pipes leading to second floor, and the cooking apparatus to be furnished by the owner.

ESTIMATE OF QUANTITIES AND PRICES RULING NEAR BROOKLYN, N. Y.

150	cu. yds. excavation,	@ $ .25	per yd.,	$ 37.50	
62000	bricks,	" 12.00	" M.,	744.00	
6781	ft. b. m. framing,	" .01½	" ft.,	101.71	
1000	" sheathing,	" .01½	" "	15.00	
40	sqs. flooring,	" 4.50	" sq.,	180.00	
	Window-frames,			50.00	
	Door-frames,			50.00	
	Sash,			60.00	
	Doors,			72.00	
800	ft. architraves, etc.,	@ $ .08	per ft.,	64.00	
960	ft. baseboard,	" .06	"	57.60	
	Blinds,			78.40	
	Outside finish,			220.00	
	Wainscot,			25.00	
324	ft. weather-boarding,	@ $ .05	per ft.,	16.20	
	Presses, etc.,			65.00	
	Stairway, etc.,			110.00	
	Privy,			12.00	
	Mantels,			165.00	
	Hardware,			20.00	
160	yds. outside,	@ $ .60	per yd.,	96.00	
315	" inside,	" .30	" "	94.00	
10	sq. shingles,	" 7.00	" sq.,	70.00	
87	yds. painting,	" .30	" yd.,	22.40	
	Glazing,			150.00	
	Plumbing and gas-fitting,			80.00	
	Labor.			300.00	$2,905.31
	Builder's profit,	@ 20 per cent,		581.06	
	Architect's fee on estimated cost,			150.00	731.06
					$3,636.37

WARING'S SYSTEM OF SEWERAGE IN PARIS.

THE order recently given by the municipality of Paris for the sewerage of a large experimental district of that city on plans prepared by Geo. E. Waring, Jr., on the Memphis system, — an order for the sewerage of about four kilometres of streets and of about one hundred large apartment-houses, — was determined by the following address, delivered by Mr. Ernest Poutzen, C. E. (*ancien élève de l'Ecole des Ponts et Chaussées*), before the *Commission technique de l'assainissement de Paris.* Mr. Poutzen said: —

When I had the honor, on the 18th of last November, to be present at your meeting, I had not been fully advised as to what I was expected to say in exposition of Waring's System.

The report of the proceedings of that meeting show that I was not clear in my exposition, and in availing myself of the opportunity that you now give me to discuss again before you the question of sanitary improvement according to this system, I beg you to excuse my past incompleteness, and to give me your kind attention.

Mr. Waring has undertaken to solve the problem of removing, with the greatest possible promptness and with the least possible expense, from habitations and from towns all of their foul wastes. This problem cannot be solved by the periodical removal of fæcal matters, and it can be done only under certain circumstances by the establishment of sewers of sufficient diameter to secure the removal of household wastes and of storm-water together.

The *periodical* removal of fæcal deposits gives these azotized matters time to enter into putrefaction, and to infect habitations. The re

moval thus often creates a great nuisance, and, as with several of the systems adopted for periodical removal, it involves very considerable outlay. Householders have a direct interest in reducing to the utmost the consumption of water within the house, which is another source of unhealthful conditions. Large sewers connected with the houses by branches cannot accomplish the end of the immediate removal of fæcal matters, unless we adopt the principle of discharging everything into the sewer. In this case fæcal matters are removed immediately from houses and the transportation beyond the limits of the city by the stream flowing in the sewer; *but only in case that the fall of the sewer is sufficient to maintain a constant given velocity, and in case that there is always a sufficient amount of flow.*

This condition is much the more difficult to secure for the reason that these sewers, calculated to carry storm-water, must have a diameter much greater than that required for the needs of foul-sewage removal. Therefore, in time of drought and especially with sewers of slight fall, the depth of the stream carrying the waste matters being slight, their removal is but slow and incomplete. Hence the hesitation to adopt the principle of discharging everything into the sewers, which, however, offers no difficulty and no danger; that is, it need give rise to no bad odor and to no dangerous emanation, if only the removal of these matters can be made rapid and complete.

Mr. Waring, in order to ensure the rapid and complete removal of fæcal matter and of all household wastes which, like the contents of privy-vaults, enter into fermentation and putrefaction if retained, diminishes to the minimum the capacity of discharge in the sewers, and excludes absolutely all rain-water. By such exclusion he secures a sufficient reduction of diameter where, otherwise, sewers of great capacity would have been necessary. It is not only nor chiefly because of the economy of construction thereby secured that Mr. Waring excludes rain-water; it is, above all, in order to avoid deposits which must result from the variable quantities (*régime irrégulier*) caused by the admission of rain-water, that he insists on this absolute exclusion. These deposits are especially to be feared in sewers of slight fall, while in the pipes which Mr. Waring employs, and in which fæcal matters are always diluted in about the same quantity of water, this danger does not exist even with reduced inclinations. In order to make perfectly certain that all deposits which might nevertheless be formed in the pipe-sewers shall not remain there long enough to enter into decomposition, he establishes at the head of each branch of the sewer an automatic flush-tank, and if the branches are long and of slight fall, he even employs more than one, or one of more than the usual size.

These flush-tanks are cisterns placed in the ground, fed from the water-supply, and so arranged that when the level of the water that they contain reaches a certain height, they empty themselves spontaneously and rapidly by means of a siphon which is brought into action when it begins to overflow. After having examined the different forms of automatic flush-tank available for such use, he has adopted that of Mr. Rogers Field.

It is hardly necessary to say that the sizes of the pipes constituting the sewer increase with the increase of duty that it has to perform. The smallest of the street sewers have a diameter of 15 centimetres. These small diameters render it necessary to prevent the introduction of all large objects which might cause obstruction. The means employed therefor are simply a reduction of the size of all house-drains to a diameter of 0.10^{m}. These house-drains and vertical soil-pipes are flushed (*rincés*) both by the discharge of water-closets and by the discharge of the ordinary waste waters of the household.

The usual size of the sewers as they increase beyond the diameter of $0.15^{m.}$ is such that at the time of greatest use they will flow to about one-half their capacity. It is found that the variation of the flow is hardly more than twenty per cent, except as increased by the discharge of the flush-tanks, which occurs with greater or less frequency according to the rapidity with which water is admitted to them. It is generally so arranged that there shall be two discharges during the twenty-four hours. These discharges carry forward all matters which may have been deposited, and they effect a washing of all that part of the pipe which is alternately covered and exposed by the variation of the current of the sewer.

If the air in the sewers were always stagnant, it might, notwithstanding the rapid removal of fæcal matters, constitute a centre of infection and of dangerous germination. By a constant removal of the atmosphere of the sewers, these dangers are avoided. The air which moves above a current of water containing *fresh* fæcal matter carries with it neither odor nor dangerous germs. Mr. Waring, in order to ensure this constant renewal of the air in the sewers, carries all of the soil-pipes above the tops of the houses, with open mouths, and he furnishes air-inlets at each junction of two sewers. These air-inlets are covered in such a manner as to prevent the introduction of rain and storm-water, and they are so arranged as to allow of the inspection of the condition of the sewers. The draught of each soil-pipe adds to the movement of air entering at these inlets. It would generally be best to establish a water-seal trap at each closet and other connection with the vertical soil-pipe; but even if these did not exist, the annoyance of open closets is avoided by the soil-pipes opening above the tops of the houses.

In reviewing what has been said of Waring's system, it is seen that it is a system of "Everything to the Sewer," with the exclusion of storm-waters, carried out in a very economical manner, replacing large sewers by earthenware pipes of small diameter receiving all the dejections and all household wastes. The sewers thus established are provided at the heads of all the branches with automatic flush-tanks, of which the capacity varies according to the inclination of the pipe, from one-half a cubic metre to one cubic metre, these delivering their contents into the sewer ordinarily twice in twenty-four hours. The fall of these sewers can, with this aid, be made as slight as $5^{mm.}$ and even $2^{mm.}$ per metre, without involving the risk of obstruction by deposits. The average velocity of the flow of these sewers varies from $0.60^{m.}$ to $0.50^{m.}$ The fear of such obstructions occurring in pipes of such small size is not justified. Experience of several years proves — but such proof was not necessary—that as the house-drains have a diameter of only ten centimetres, they serve as strainers to hold back objects which might cause obstructions in the larger sewer.

Of course it would be better to connect with Waring's sewers only such houses as are supplied with drains and soil-pipes $0.10^{m.}$ in diameter, but there is no reason why we may not also connect with houses in which the soil-pipes are much larger, provided all inlets into these soil-pipes from water-closets and elsewhere are sufficiently reduced, and if these soil-pipes are continued above the roofs of the houses and left open at the top. With these sewers it is not necessary to use water-seal traps separating the house-drain from the sewer. In this manner we avoid obstructions to the free flow of the drainage, and the occasion for the deposit of azotized matters. All that is susceptible of putrefaction is immediately removed, and the air circulates and renews itself always in the sewers and in the house-drains.

With Waring's system it is no longer a matter of interest to secure a reduction of the quantity of water used in the house. All that is required for any purpose can and ought to be discharged into the sewer. The greater the amount of water used in a house the better. It is only necessary that storm-water, which causes enormous variations in the discharge, should be absolutely prevented from entering these sewers.

It may be asked, however, what is the minimum quantity of water per person and per day which extreme cases would suffice to insure the operation of the system. Experience has demonstrated that a consumption of water, per head, of three litres in the water-closet and twelve litres in other uses of the household — that is, fifteen litres altogether—will secure the complete transportation of fæcal matter in the sewers. Flush-tanks of one-half a cubic metre, each discharging twice a day for each two hundred of the population would add 5 litres of water to the consumption, which raises the whole necessary quantity per day to 20 litres per person. If we estimate that the average dejections of each person are represented by 2.9 litres, of which one-eighth is solid matter, and seven-eighths liquid, the transportation of these solid matters in the sewers will, in this extreme case, be effected by the flow of eighty-four times their volume of water.

What is to be done with these azotized matters thus removed from the centre of population? Mr. Waring has not given us his advice on this subject, but it is quite certain that they can either be discharged into water-courses or utilized for agriculture. The fact that they remain always diluted in about the same proportion of water, has its importance, whatever is their ultimate destination.

It may be asked why Waring's system has not already been applied on a large scale in many cities. Permit me, gentlemen, to call your attention to the fact that this system in its entirety was not invented (*n'a été imaginé*) until 1880, and that it was at once well received in the United States of America. After Memphis, Tenn., which has about 68 kilometres of sewers of Waring's system, the cities of Omaha, Neb., Norfolk, Va., and Kalamazoo, Mich., have each had constructed up to this time some 12 or 13 kilometres of sewers under the same system; the city of Keene, N. H., has already 20 kilometres. The cities of Pittsfield, Mass., and Birmingham, Ala., have already begun its construction. It is true that these are places of only from 8,000 to 40,000 inhabitants, but the city of New Orleans, La., and Baltimore, Md., with a population of 225,000 and 405,000 respectively, have also decided to adopt Waring's system, and from the last information that I have received, other important places seem about to follow the example.

Although Mr. Waring places at the bottom of the trenches in which he lays his sewers, if the soil is unduly wet, the ordinary drain-tiles, the direct rainfall is in no way admitted to the system. It is left to flow over the streets like water used for washing. For the treatment of this water it is necessary to establish according to circumstances,— that is, according to the inclination of the streets and the amount of water to be provided for, either open gutters or covered conduits.

Paris, already supplied with such a fine system of sewers, finds itself, nevertheless, still far from having satisfied the reasonable demands of the population.

In Arrondissement I there are about 3,400 metres of streets without sewers.
" " II " 5,800 " " "
" " III " 7,000 " " "
" " IV " 8,400 " " "
" " V " 8,000 " " "
" " VI " 9,600 " " "
Making in the 6 Arrondissements 42,200 kilometres of streets without sewers.

Without continuing this enumeration of the length of streets still unprovided with sewers, permit me to recall to your minds that there are in the interior of Paris broad areas densely populated which are without a single sewer.

In Arrondissement XVI (Auteuil) about 30 hectares.
" " XVIII (Montmartre) 150 "
" " XIX (Belleville) 50 "
" " XX (Ménilmontant) 50 "

This, however, is not all, even supposing the 20 arrondissements of Paris to be sufficiently supplied with sewers, would that permit the suppression of privy-vaults or movable receptacles? — the first condemned by the whole world, the last losing from day to day more adherents. No: because, in order to put into execution the principle of "Everything to the Sewer," it is necessary that there should be secured, in the sewers, a permanent and rapid flow of fæcal matters, and that even in time of drought.

If, on the one hand, the enormous length of sewers remaining to be constructed in Paris requires us to seek means for their rapid and economical construction; on the other hand, the considerable extent of sewers of insufficient fall for the transportation of fæcal matter requires either their transformation, or their supplementing by economical means which will render admissible the direct discharge into them of these different substances. Waring's system applied in the first of these cases would leave the care of storm-water an open question, but would insure the *immediate* suppression of vaults; in the second case the addition of Waring's system would constitute a sufficient supplement to existing facilities to render the districts in question absolutely salubrious.

The pipe sewers of this system should, in either case, discharge into the existing sewers where there is a sufficient fall to insure the permanent and rapid removal of all fæcal matters so delivered. However rich the city of Paris may be, its Budget will not, nevertheless, permit

it to carry on the construction of this system of large sewers with the same activity as those of this new system, costing not more than the fifth part of the former. The introduction of Waring's system to the extent that I have indicated, will permit of the suppression of vaults in all the poorer and most populous quarters of Paris, which are now deprived of all but a few central sewers. It is only by thus suppressing the causes of the evil that we shall be able to abolish those epidemics which have given Paris such an unfavorable position as to death-rate as compared with other great cities. We must not, however, confine our improvement to the limits of the city proper. The miasm does not respect these lines of demarcation. The agglomerations of population in the suburbs of Paris require also to have their sanitary condition improved. I will cite only the zone outside of the walls on the northwest of Paris, which extends from Neuilly to Clichy, comprising Villiers, Courcelles, Lavalles, Champerret and Lavallois-Perrel, and which, with an area of about 800 hectares lying between the fortifications of the Seine and between the Avenue du Boule and the Western Railway has, including the two great *collecteurs*, only about 6 kilometres of sewers.

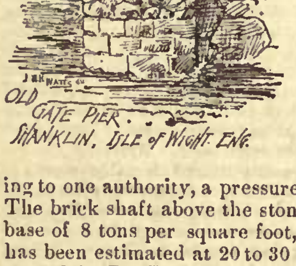
You observe, gentlemen, that if Waring's system is, in itself, a means for improving the healthfulness of a city, it is also an economical means for completing the existing system of sewerage, and it is for this reason that I hope that you will decide to adopt it; causing sewers to be built according to this system inside of large sewers of insufficient inclination in certain streets, and by filling with complete net-works of the same construction the great gaps that I have had the honor to indicate.

The immediate consideration of the storm-water question is not, in fact, of great importance, either in the region about Auteuil, where the greater part of the houses are surrounded by gardens, nor in the districts of steep inclination, such as Montmartre, Belleville and Ménilmontant."

After the discussion which followed the reading of the above paper, this resolution was adopted: "Before giving its opinion on the availability of Waring's system, the Second Sub-Commission would like to see made an experiment of special sewerage for water-closet matters and household waters under conditions analagous to those that Mr. Waring has indicated as applied at Memphis, and to charge him with the execution of this experiment, as the undertaker of the work, in a quarter of Paris.[1]"

In pursuance of this resolution the authorities have given to The Drainage Construction Company of Boston, owning the Waring patents, an order to lay special sewers inside of the large storm-water sewers, and to rearrange the interior drainage of about one hundred houses connected therewith. The sewers are to be constructed at the cost of the city, and the house-drainage and connections at the cost of the owners, the latter in consideration of a remission of sewer taxes for five years, which will be sufficient to cover all necessary outlay. The district selected will probably be the Rue des Saints Pères and adjoining streets. The population served will be from 7,000 to 10,000.

BRICKWORK IN COMPRESSION.



THE subsidence or failure of lofty chimneys, erected for chemical works and factories, might profitably suggest the importance of collecting data relative to the highest direct pressure which shafts of masonry and brickwork actually sustain with safety. The effect of wind on a lofty chimney is to intensify the pressure on one side, a condition which ought not to be overlooked in the construction of such shafts. Undue pressure may also be caused by settlements, expansion by heat, etc. We have little trustworthy information bearing upon the question of pressure actually sustained at the bases of lofty buildings, such as chimney-stalks. The great chimney at Edinburgh is 341 feet in height, it rests on a hard clay shale, and its base 40 feet square, makes, according to one authority, a pressure amounting to 2½ tons per square foot. The brick shaft above the stone pedestal exercises a pressure at the base of 8 tons per square foot, while the strength of ordinary brick has been estimated at 20 to 30 tons per square foot. Mr. C. Cowper, quoted in Dr. Downing's "Elements of Construction," furnishes a few other examples. The chimney at Adkins's Soap Works, near Birmingham, is 312 feet high, and the pressure on the base is 6 tons per square foot, and on the foundation below the footings, 1½ tons per square foot. This chimney was reduced in height from the corrosion of the brick at the top caused by the muriatic acid which escapes. The chimney at the Lap-welded Tube Works is 145 feet high, and the pressure at the base is calculated at 8½ tons per square foot of the hexagonal base. A glass-house cone 75 feet high had 4 tons per foot on the piers between the arches, which is thought as much as should be allowed where the brickwork is exposed to great heat. The great chimney of St. Rollox, near Glasgow, is 455 feet high, and is 41 feet diameter at the base, diminishing to 13 feet at the summit. So long as the pressure is not greater than one-twelfth of the ultimate resistance of the material, there need be little anxiety felt; but accidental causes, such as wind, leaning from a yielding foundation, and settlement may bring the pressure on some portion of the beds to within a limit at which the structure would not be safe. Inferior bricks are often used in construction of this kind, and when these are used in the foundations or base, the margin of safety becomes considerably diminished. In the oversetting tendency of wind on a high pile of brickwork, the pressure is suddenly shifted to one side, the leeward, and if the resultant approaches the outer face of the work, the pressure may be so increased as to cause a bulging or crushing at the joints, such as the Bradford chimney disclosed. In calculating the pressure of the wind upon a circular shaft, only one-third of the effect produced on a plane surface of the same vertical section must be taken, and this force is found to act at a centre of pressure taken at half the height of the shaft. Of course, against this moment or overturning force there is the weight of the brickwork, multiplied into the radius of the base. The smaller the diameter of the shaft, the greater is the pressure sustained on a certain unit or square foot of the base, and the greater is the rocking tendency; also the less active power is there to counterbalance the pressure of external forces like wind. To load, therefore, a small base, the builder ought to use the utmost care in selecting the truest and hardest bricks, in equally distributing the pressure, and in providing against lateral forces like the thrust of an arch, which can only produce an uneven compression and tend to produce failure. These observations extend to all brick and masonry structures which rest on small areas, such as towers, columns, piers, chimney-shafts, and lofty walls. Of course, by widely spreading the footings, the pressure can be diminished generally to within very safe limits; but as a rule it will be found the highest direct pressure occurs just above the base — a point where the closest supervision is needed in seeing that sound, hard, bricks and good mortar are employed in the construction.—*The Building News.*

[1] Avant de donner son avis sur la convenance du Système Waring, la 2me Sous-Commission désirerait voir faire un essai de canalisation spécial pour les vidanges et les eaux ménagères dans des conditions analogues à celles que lui a indiquées M. Waring comme appliquée à Memphis, et de le charger de réaliser cet essai, à titre d'entrepreneur, dans un quartier de Paris.

CUBING TO OBTAIN APPROXIMATE ESTIMATES.

No. 717 Walnut St., Philadelphia, Pa.

To the Editors of the American Architect: —

The attention of students in the profession is called to a matter which may properly be said to belong to office superintendence, and which, viewed in several lights, is of great importance. The practice of making calculations upon the cubical contents of projected buildings, by taking a fixed rate and making certain allowances, is well understood. The practice as it stands is forcedly empirical, and must remain so essentially, only it is thought that it might be made more satisfactory by the adoption of some system of comparisons that will give a fairer average rate. A sufficiency of material exists, stored in the drawings and notes of work done, say, in the last two years, which, if collected and placed in tabular form, and added to with notes of future work, will be found useful in various ways, being especially valuable as a journal of office work, besides an assistance in making out appropriate estimates.

Set down: —

1. Title of the building; for whom erected; where located.
2. Name of the builder, working by contract or day's labor.
3. Material and nature of the work.
4. Dates of commencement and finishing.
5. Total cost, exclusive of architect's fees.
6. Contents in cubic feet.
7. Cost per cubic foot.

This regular formula to be filled up for all buildings of whatever description, and to it may be added, *ad libitum*, according to requirements, special extra notes describing synoptically the heating, plumbing, any particular utilitarian or decorative features, and giving the cost of each item. It is suggested that, in connection with its very valuable price-lists of supplies and labor, and building intelligence, the *American Architect* might publish certain data of this kind relating to the various extensive buildings erected annually throughout the country, which would give material aid to students in prosecuting the study of the all-important subject of intended costs; and such information could not fail to be of use to practising architects. This suggestion is offered with deference; and should these remarks provoke discussion, the object of the writer is attained. Very respectfully,

Adrian Worthington Smith.

[If any examples of the estimates obtained by cubing should be sent us they would unquestionably find a place in our columns. Contributors of drawings for publication might increase the too meagre interest of their descriptive text by giving the actual cost per cubic foot. — Eds. American Architect.]

HYDRAULIC BRICK-MACHINES.

To the Editors of the American Architect: —

Dear Sirs, — Can you tell me at what points in this country brick-machines operated by hydraulic power are located? B.

[The only makers that we feel sure employ these machines are the Hydraulic-Press Brick Co., 411 Olive St., St. Louis, Mo. — Eds. American Architect.]

AN EXPLANATION.

Boston, April 9, 1883.

To the Editors of the American Architect: —

In repairing and restoring, and, to a limited extent, enlarging my house at Waltham, the architects, Messrs. Hartwell & Richardson, had so much work to do that "rebuilding" may be expressive, in a certain way, of what was done, but what you say in your past number (April 7), when referring to the illustrations of the house, is fundamentally incorrect, and will be thoroughly misleading to those who are not familiar with the work that has been done.

"To rebuild on the original spot" implies a taking down which did not take place, and "retaining certain rooms" is not an appropriate expression, because *all* the main rooms of the old house, on both parlor and chamber stories, are the same as they were, in their divisions and in much of their finish, except as modified by the bay-windows, which were added to break the front, which, by raising the whole house from its foundation two or three feet, and changing the low attic into a square story, had become considerably higher.

Several of the chief rooms are precisely as they were, and all through the house the best of the old interior finish is preserved. The ground plan is of the same size as before, in fact, in all its essential features, the house is but little changed. The circular porch in front in place of a comparatively modern square one is a restoration, and so are a few other minor changes within and without.

As so much pains was taken, by ourselves and by the architects, to preserve and restore the old house, I feel desirous of doing away with the impression that the house was razed to the ground, and that only a few relics have been preserved.

I wish to add that most admirable work was done by Messrs. Hartwell & Richardson, not only in improving the accommodations of the old house, but in extending through it delightful details of interior finish, and in adding several features of great value and beauty.

Yours respectfully, Arthur T. Lyman.

THE PROPORTION OF CHANCEL TO NAVE.

Galt, Ont., April 11, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Would you please inform me through the next issue of your valuable paper, whether there is any particular proportion of the chancel to the nave in an Episcopal church, as a gentleman said that he thought that a third of the length of the nave should be the length of the chancel, and I did not think that there was any particular proportion.

Yours truly,

F. W. Mellish.

[A very common way in modern Episcopal churches is to make the chancel a square, that is, with the depth equal to the width of the clerestory. If the chancel is to have an apsidal end, the semicircle or semi-octagon should be in addition to the square. — Eds. American Architect.]

NOTES AND CLIPPINGS.

Air-Proof Cement.— C. Pascher finds that the only substance which is really efficacious for rendering cements unalterable by the air, is a cold solution of one part of sulphate of iron in three parts of water. The cement articles are left in the solution for twenty-four hours; at the end of this time they take a greenish-black tint, due to the hydrated protoxide of iron. The absorbed solution is decomposed in the interior of the cement; the weight of the cement is increased ten per cent; all the pores of the mass are thus stopped by the hydrate, and as this combination is not attacked by the air, the cement itself becomes unalterable. Cement facings may be whitewashed with several coats of the solution. After drying the cement may be covered with a wash of ochre, or by a solution of ten per cent of sulphate of alumina in three parts of water. For a greenish-white coating, the surface may be first washed with a solution of chrome alum and then with soapsuds. Either of these coats may be painted in distemper. When oil colors are used upon naked cement they easily scale off. This inconvenience may be avoided by washing the cement with soapsuds, letting it dry, and rubbing with a brush or linen cloth until the surface shines.—*Chronique Industrielle.*

Mr. J. P. Sedding on Young Designers.— In concluding a lecture Mr. Sedding deprecated the practice of calling upon young men to design. He never encouraged a young man to design at all, because he believed it to be against his own best interest and the interest and honour of art that he should trade on insufficient knowledge, or make a call upon a personality which is only in embryo. Why, he could not render the great qualities of a great thing, even if he tried to copy it, any more than a strumming school-girl could play Beethoven! What was the good of a young architect spinning thoughts out of brains whose fibres were not equal to the strain of weaving? Let him rather, like the novice in a monastery, learn to keep silence — yea, even from good words. Let him, during a long noviciate, learn the real nobility of his high calling. Let him read his Ruskin; plod patiently on in the modelling class; let him learn the true principles of design; study the best principles; train his hand, his soul, his imagination; let him go to concerts, read poetry, prose, and romance, and combine with this all that he can possibly cram up of the history and composition of glue, of the newest electric light, the choicest method of laying drains and ventilating them with imperial self-acting exhaust ventilators, and know all about warming and acoustics and girders; let him draw and study flowers, foliage, animals, men, birds, trees, rocks, glaciers: let him seek to gather all that is "fair and fit" in all creation, but let him not design.

Discovery of a Coptic Church at Thebes.— At the last sitting of the Académie des Inscriptions et Belles-Lettres, a communication was read from M. Maspero, director of the Boulak Museum at Cairo, relating to the discovery on the site of old Thebes of a Copt church, dating from the fifth century. It appears that in the course of some excavations made by him last year, M. Maspero unearthed at the bottom of a tomb a limestone sarcophagus covered with inscriptions. Circumstances prevented its removal at the time, but in January last the spot was revisited and, while the necessary preparations for moving it were being carried out, the explorer caught sight of a fragment bearing a half-effaced inscription in Coptic. Further researches were commenced and speedily resulted in turning up several pieces of tile-work (*ostraca*), likewise covered with characters. Three days' further work sufficed to lay bare the church in question. Access to it is gained by a descending flight of five steps in brick; the floor is paved, and the walls, which are constructed of brick and white plaster, bear numerous inscriptions in several languages. To the left of the steps on entering is a large framed slab of stone, plastered over and containing in red ink, the brilliancy of which seems unimpaired, what is evidently the conclusion of a sermon in Theban Greek denouncing the Monophysite heresy. On the opposite side are the remains of another slab of similar kind, and other fragments bearing the teaching of Cyril of Alexandria on the nature and attributes of Christ, portions of sermons on the virginity of Mary the mother of our Lord, upon the doctrine of the Trinity, etc.; while the walls of the grotto are almost covered with *proscynèmes* (devout exclamations) in Copt, Greek, and Syriac, addressed to Saint Epiphany, Saint George, and Saint Phœbammon. M. Maspero evidently attaches considerable importance to these discoveries, for he has undertaken to keep the Academy posted up in the results of the further excavations he purposes undertaking in the neighborhood of the spot. — *The Architect.*

A large elm tree at Norwich Town, Conn., has moved a house one foot from its original position. The tree is more than seventy years old and the trunk reaches a height of thirty feet before a limb branches out.

Solid and Hollow Iron Columns.— A confusion of ideas is sometimes found among practical men respecting the comparative strength of solid and hollow pillars. One hears it often said, for instance, that a hollow pillar is stronger than a solid one. Now this is, as one able authority has pointed out, not absolutely the case; it is perfectly true, that comparing the strengths of two pillars of the same height and diameter, one solid and the other hollow, that the latter has the advantage of being economically stronger. The fact is, the solid column is stronger than the hollow of the same external diameter; but the lesser area is more effective than the greater, because the central portions of the solid pillar are less useful in resisting the bending force than the metal in the circumference of the hollow pillar. But if the quantity of material in both the solid and hollow pillar of equal height is the same, the hollow pillar is by far the stronger. A simple geometrical construction will enable any one to understand this fact, by enabling us to proportion a hollow column of the same area as that of a solid one, by one of the diameters being given. It is shown, in fact, that hollow columns of the same area of metal as a solid one, may be made to any larger diameter, their strengths increasing proportionately till a limit is reached by the shell of the metal becoming too thin to insure a sound casting. Taking an example from Downing's work, a hollow pillar 9 inches in external diameter, having an internal diameter of 8.062 inches, and a thickness of metal of .47 inches, or about one-half-inch is five and one-half times stronger than a solid pillar with the same quantity of metal. A thickness of one-half-inch may be regarded as a practical limit in manufacture. — *The Building News.*

The Pitch Lake of Trinidad.— I visited the so-called Pitch Lake, Trinidad, September 30, 1882, landing per steamer at La Brea, on the west coast of Trinidad, about forty miles south of the port of Port-of-Spain. The lake in question is situated about one and one-half miles from the shore. There is a gentle ascent of 140 feet from the shore to the lake. The name "lake" is a misnomer, if we understand by the term a cavity containing a liquid. The contents of this cavity, or supposed cavity, is a concrete, slightly flexible mass of pitch; it is a level plain, on which bushes, and patches of vegetable formations, and pools of water are seen here and there over the surface. There is no difficulty in walking or wading over it from end to end, or from side to side. The shape of this plain is a sort of ellipse or ovoid. The water in the pools is rain-water, having a slight iron taste. Arriving on the plateau I found, first, a number of chestnut-colored females washing and bleaching linen, and in other parts a number of two-wheeled carts, drawn each by a single horse, in the act of being loaded with pitch. Scattered here and there over the surface were to be seen dark, yellow-brown colored men with pickaxes digging out large clods of pitch, which boys gathered out from the pit and piled up for the carters. The pitch at almost every blow of the pickaxe broke off with a resinous fracture quite easily. Each lump of pitch exhibited air cavities of the size of a pigeon's egg, larger or smaller. I was informed by the diggers that they never dig deep enough to find the pitch soft and plastic; but they asserted that in the course of a couple of days the cavity which they had dug would be again level with the surrounding plain. This assertion, I think, must be taken with considerable reservation. This pitch deposit, I imagine, like any other mineral deposit, will become entirely exhausted in the course of time, resembling in this respect our oil wells in Pennsylvania. But it will take a long time to do this, for the area of this visible deposit is about 100 acres, which is equivalent to 4,360,000 feet, and 4,360,000 feet surface and one foot deep will give the same number of cubic feet. Now, allowing the weight of one cubic foot of pitch to be 60 pounds (it is really more), we shall get by computation 261,360,000 pounds, which number divided by 2,240 gives 116,678 tons for the weight of a single layer of pitch on Pitch Lake one foot deep. How deep this pitch deposit is absolutely is not yet known with accuracy, or even approximately. — *U. S. Consul Towler's Report.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

275,346. HOLDER FOR MORTISING-CHISELS. — Geo. W. Amesbury, Philadelphia, Pa.
275,369. HYDRAULIC-CEMENT COMPOUND. — Edward J. De Smedt, Washington, D. C.
275,381. SOLVENT FOR PAINTS, OILS AND VARNISHES. — Jas. A. Henry, Platteville, Wis.
275,403. COMPASSES. — Jacob Neimeyer, Atlantic, Iowa.
275,409. HEATING-DEVICE. — Jas. D. Potter, Portland, Me.
275,414. SAW-HANDLE. — William W. Richardson, Indianapolis, Ind.
275,421. DERRICK. — John T. Scully, Cambridge, Mass.
275,456. SASH-HOLDER. — John M. Baldwin, Sidney, N. J.
275,467. BRICK-MAKING MACHINERY. — Cyrus Chambers, Jr., Philadelphia, Pa.
275,477. BRICK AND TILE KILN. — Jesse L. Friend, Perrysburg, Ind.
275,492. BLIND-STOP. — Joshua Hunt, Providence, R. I.
275,507. COMPOSITION FOR ROOFING, ETC. — Nathan McCoy, Manchester, N. H.
275,514. FIRE-ESCAPE. — James Pappa, Oswego, N. Y.
275,533. DOOR-LATCH. — William E. Sparks, New Britain, Conn.
275,538-539. BENCH-PLANE. — Levi C. Strong, Albany, N. Y.
275,540. DERRICK.—Geo. W. Tarr, New York, N. Y.
275,559. HAND-SAW ATTACHMENT. — Henry Winter, Hanover, Ill.
275,573. AWNING-FRAME. — Geo. Borst, Rochester, N. Y.
275,574. DEVICE FOR FEEDING AIR TO FURNACES. William J. Bradshaw and William W. Cowley, Cleveland, O.
275,585. APPARATUS FOR HEATING AND VENTILATING ROOMS. — Angus K. Campbell, Newton, Io.
275,597. PLANING-MACHINE. — Henry J. Cordesman, Jr., and John R. Thomas, Cincinnati, O.
275,608. FIRE-ESCAPE. — Warren W. Drake, Girard, Ohio.
275,647. PORTABLE ELEVATOR. — Joseph T. Haines, Balbec, Ind.
275,656. PNEUMATIC ALARM-LOCK FOR JAILS. — Isaac Hodgson, Indianapolis, Ind.
275,658. FIRE-ESCAPE. — Edwin J. Howe, Newark, N. J.
275,706. FASTENER FOR THE MEETING-RAILS OF SASHES. — Andrew M. Rantz, Cambridgeport, and Chas. L. Engelhardt, Boston, Mass.
275,716. WATER-CLOSET CISTERN. — William Scott, Faulkner, Mass.
275,726. ATTACHMENT FOR INSIDE DOORS. — John Smith and John P. Rhodes, Rockville Centre, N. Y.
275,731. FIRE-EXTINGUISHER. — George W. Taylor and Abner R. Cox, Belton, S. C.
275,752. FIRE EXTINGUISHER AND ALARM. — Chas. E. Buell, New Haven, Conn.
275,755. SINK. — Wm. W. Elliott, Reading, and Wm. J. Towne, Newton, Mass.
275,757. STEAM-RADIATOR ATTACHMENT. — Geo. Engel, Buffalo, N. Y.
275,772. FIRE-ESCAPE. — Jos. B. Kennedy, Princeton, Ind.
275,778-779. FASTENER FOR MEETING-RAILS OF SASHES. — Michael W. Mahar, National Military Home, Ohio.
275,785. VAULT-COVER. — Elhanan Omensetter, Philadelphia, Pa.

SUMMARY OF THE WEEK.

Baltimore.

STORE AND DWELLING. — W. F. Weber, architect, is preparing drawings for Jas. A. Wilson, Esq., for a four-st'y brick store and dwell., with stone finish, 18' x 43', to be built at 72 North Eutaw St., and to cost $3,800.

RECTORY. — Mr. Geo. A. Frederick, architect, is preparing drawings for a three-st'y brick and stone rectory, 37' x 40', for the Church of the Holy Martyrs, to be built cor. Mount and Lombard Sts., and to cost $7,000.

ADDITIONS AND ALTERATIONS. — A. S. Abell, Esq., is about to have built a four-st'y brick and marble addition, 20' x 58', to his residence, cor. Charles and Madison Sts., and to erect an additional story to the present structure, besides alterations, from designs by Geo. A. Frederick, architect; cost, $30,000. The same architect is preparing plans for the alteration of the dwelling of Mrs. Kerr, South Sharp Street, to stores.

BUILDING PERMITS. — Since our last report fifty-nine permits have been granted, the more important of which are the following: —

J. Herget, two-st'y brick building, s e cor. O'Donnell and Curley Sts.

Merchants' and Mechanics' Permanent Building and Loan Co., 5 three-st'y brick buildings, e s Gravel Alley, between Franklin and Centre Sts.

Elizabeth Lambla, 5 two-st'y brick buildings, w s Towson St., between Beason and Clement Sts.

Johns Hopkins Hospital, five-st'y brick and iron warehouse, s e cor. Light and Water Sts.

John Q. Coding, 14 three-st'y brick buildings, e s Fulton St., between Baltimore St. and Frederick Road, and a three-st'y brick building, s s Baltimore St., e of Fulton St.

Wm. H. Olen, two-st'y brick stable, 176 West Falls Ave.

Wm. Schaffell, three-st'y brick building, s e cor. Chase and Hillman Sts.

Frederick Burger, 2 two-st'y brick buildings, e s Baker St., between Division St. and Pennsylvania Ave.; also, 3 three-st'y brick buildings, s s Fairmount Ave., s e cor. Castle St.; also, two-st'y brick stable and 3 two-st'y brick buildings, e s Castle St., s of Fairmount Ave.

Samuel T. Edel, 2 three-st'y brick buildings, e s Harford Ave., between Preston and Biddle Sts.

T. W. M. Crook, three-st'y brick stable and dwell., in rear of e s Paca St., between Lexington and Fayette Sts.

Henry Wicks, two-st'y brick building, w e Port Alley, between Aliceanna St. and Canton Ave.

L. H. Robinson, 3 three-st'y brick buildings, w s Mount St., s of Lanvale St.; also, two-st'y brick carpenter-shop and two-st'y brick building, e s Bruce Alley, s of Lanvale St.

Miss Betty Meyer, 2 three-st'y brick buildings, e s Gay St., between East and Chestnut Sts.

Dr. H. P. C. Wilson, three-st'y and mansard brick building, w s Park Ave., between Madison and Richmond Sts.

Boston.

ANNUAL REPORT OF INSPECTOR OF BUILDINGS. — The following items are taken from the annual report of the Inspector of Buildings of the City of Boston: —

During the year 1882 there were 235 permits granted for brick, stone and iron buildings; 838 permits for wooden buildings; 23 special permits for wooden buildings within the building limits; and 2,205 permits for additions, alterations and repairs.

There were 238 brick buildings completed during the year, at an estimated cost of $4,932,640, on which final reports were rendered; of wooden buildings there were 788 completed, and a cost of $2,379,278; and 2,263 additions, alterations and repairs were made, at a cost of $1,607,051.

395 buildings were damaged by fire, at a total loss to buildings of $186,372.

BUILDING PERMITS. — *Brick.* — *Orchard St., No.* 41, Ward 20, for Nathan A. Wilbur, dwell., 30' x 30' and 34', three-st'y flat; Nathan A. Wilbur, builder.

Endicott St., No. 180, *and Endicott Ct., No.* 12, Ward 7, for John O'Connor, dwell. and store, 16' and 18' 6" x 36' 6" and 44', four-st'y flat.

West Chester Park, No. 187, Ward 18, for David H. McKay, family hotel, 60' x 80', six-st'y flat; D. H. McKay, builder.

Oliver St., No. 91, Ward 12, for A. W. Stetson, store, 23' 7" and 24' x 48' 6", four-st'y flat; G. W. Pope, builder.

Eustis St., No. 214, Ward 20, for the E. Howard Watch & Clock Co., dry-house, 32' x 63', one-st'y flat; D. H. Jacobs & Son, builders.

Clark St., Nos. 28 *and* 30, Ward 6, for Patrick Canny, dwell., 26' 5" x 30', four-st'y flat; Dennis Sullivan & Son.

Wood. — *Lexington St., Nos.* 236 *and* 238, Ward 1, for James Frame, 2 dwells., 21' 6" x 32', two-st'y mansard; Frame & Patten, builders.

Walnut Ave., No. 171, rear, Ward 21, for Harrison G. Hunt, stable, 20' x 27', one-st'y pitch; Isaac Sprague, builder.

Boylston Ave., near Boylston St., Ward 23, for Abraham Bell, coal storage, 20' x 40', one-st'y flat; A. A. Ayers, builder.

Chestnut Ave., near Spring Park Ave., Ward 23, for Frederick Koop, 22' x 38' and 13' x 17', two-st'y pitch; Jacob Luippold, builder.

Clifford St., No. 18, Ward 21, for Geo. Davis, dwell., 22' x 32', two-st'y pitch.

Rossiter St., near Eldon St., Ward 24, for Hazard Stevens, dwell., 26' 6" x 32', one-st'y mansard; Samuel T. Waters, builder.

Unnamed St., cor. Ellery St., Ward 15, for Wm. T. Abbott, 7 dwells., 17' x 36', two-st'y mansard; Jas. F. Smith, builder.

Wyman St., cor. Gilbert St., Ward 23, for John L. Dakin, dwell., 30' and 35' x 38', two-st'y hip; John L. Dakin, builder.

K St., cor. East Eighth St., Ward 14, for Ellen P. Rich, 3 dwells., 13' x 19' and 20' x 30', two-st'y mansard; D. A. Berry, builder.

Paris St., Nos. 108 *and* 110, for Thomas McKenley, skating-rink, 100' x 137', one-st'y flat; A. & J. McLaren, builders.

East Sixth St., near O St., Ward 14, for Phelix Smith, hotel, "Grant House," 40' x 50' and 46' x 65', two-st'y flat; John Harrison, builder.

Wayne St., near Blue Hill Ave., Ward 31, for H. A. Wood & J. F. Wetherbee, 2 dwells., 28' x 39' and 13' 6" x 18', two-st'y pitch; Wood & Wetherbee, builders.

Dale St., near Walnut Ave., Ward 21, for Wm. Donaldson, dwell., 21' x 31' and 15' x 15', two-st'y pitch; Wm. Donaldson, builder.

Dunstable St., near Main St., Ward 5, for Reed Bros. & Sawin, stable, 30' and 35' x 68', two-st'y flat; A. B. Perham, builder.

Elm Hill Ave., near Crawford St., Ward 21, for John F. Blinn, dwell., 36' x 38' 8" and 17' 8" x 24' 6", two-st'y hip; B. D. Whitcomb, builder.

Bennington St., Nos. 190 *and* 192, Ward 1, for Joseph Perry, dwell., 20' x 40', three-st'y flat; Charles E. Day, builder.

Saratoga St., near Moore St., Ward 1, for Edwin J. Turner, dwell., 20' x 30', one-st'y pitch; Edwin J. Turner, builder.

Geneva Ave., near Blue Hill Ave., Ward 24, for S. W. Wales, carriage-house, 30' x 40', one-st'y flat; Alexander Murray, builder.

Webster Ave., rear, near Brighton Ave., Ward 25, for Jacob W. Berry, dwell., 22' and 34' x 34', one-st'y pitch; Jacob W. Berry, builder.

Davis St., rear, near Porter St., Ward 1, for Neil E. Campbell, stable, 38' x 50', two-st'y flat; Leonard Pickering, builder.

Shamrock St., near Dorchester Ave., Ward 24, for Patrick Finnegan, dwell., 22' x 32', three-st'y flat; Michael Ryan, builder.

Commercial St., near Dorchester Ave., Ward 24, for Leander E. H. Jones, 2 dwells., 20' x 40', two-st'y flat.

Unnamed St., rear, opposite Dorchester Ave., Ward 24, for John Haggerty, storage, 18' x 30', one-st'y flat; Joseph Orr, builder.

Delle Ave., near Parker St., Ward 22, for Michael Cunningham, dwell., 24' x 30' 10", and 18' x 21', two-st'y mansard; E. W. Bishop, builder.

West Cottage St., near Brook Ave., Ward 20, for Wm. W. Dromey, 2 dwells., 20' x 38', two-st'y flat; Wm. W. Dromey, builder.

Laurel St., No. 30, Ward 21, for A. Anderson, dwell., 20' and 22' 6" x 33', two-st'y hip; A. Alexander, builder.

Bearse Ave., near Butler St., Ward 24, for Walter Brown, dwell., 22' x 30', two-st'y hip; F. M. Severance, builder.

Dorchester Ave., No. 531, rear, Ward 15, for Michael Camphell, carriage-house, 28' x 50', two-st'y flat; John M. Burke, builder.

School St., Ward 5, for Aaron Hook, dwell., 21' x 42' and 28' x 36', three-st'y flat; Moses P. Bickford, builder.

Mather St., near Dorchester Ave., Ward 24, for Thomas Watson, dwell., 25' x 33' and 15' 6" x 18', two-st'y hip; John H. Burt & Co., builders.

East Sixth St., cor. Q St., Ward 14, for Robert F. McGlynn, restaurant, 24' x 35', two-st'y flat; John Harrison & Co., builders.

Boston St., rear, near Clapp Pl., Ward 24, for Henry A. Griswold, stable, 30' x 30', two-st'y pitch.

Saratoga St., cor. Wadsworth St., Ward 1, for Thomas H. Newby, dwell. and store, 21' x 32', three-st'y flat; Thomas H. Newby, builder.

Warren St., near Devon St., Ward 21, for John E. Kinney, dwell., 34' x 39', two-st'y pitch; John H. Burt & Co., builders.

Whitney St., near Tremont St., Ward 22, for Arthur Morgan, dwell., 25' x 38', two-st'y mansard.

Wales St., near Blue Hill Ave., Ward 24, for Stanley D. Poole, dwell., 26' x 38' 6", two-st'y pitch; John Harrison & Co., builders.

Warren Ave., near Harvard St., Ward 24, for Jas. Nesbitt, dwell., 27' 9" x 28' and 13' x 21', two-st'y pitch; John Harrison & Co., builders.

Whitney St., No. 46, Ward 22, for James Harrigan, dwell., 24' x 37', three-st'y flat.

Brooklyn.

STABLE. — A brick stable, two stories high, 25' x 40', is to be built on Clifton Place, for Mr. E. P. Loomis, from designs of Mr. Jas. M. Farnsworth, of New York.

BUILDING PERMITS. — *Madison St.*, s s, 200' e Tompkins Ave., 5 two-st'y brownstone front dwells., tin roofs; cost, each, $4,500; owner, architect and builder, Jas. A. Thomson, 300 Lexington Ave.

Marcy Ave., w s, 24' s Heyward St., 4 three-st'y brick dwells., tin roofs; cost, each, $5,500; owner and builder, H. Grasman, 807 Willoughby Ave.

President St., s s, 80' w Sixth Ave., 4 three-st'y brick flats, gravel roofs; cost, each, $7,000; owner and builder, I. M. Brown, 525 Quincy St.; architect, C. B. Sheldon.

On North Pier, Atlantic Dock Company, one-st'y frame storage-shed; cost, about $20,000; owners and builders, Atlantic Dock Co., 1 Hamilton Ave.

Hancock St., n s, 50' e Bedford Ave., 3 three-st'y brownstone front dwells., tin roofs; cost, each, $8,000; owner and builder, S. E. C. Russell, 58 Hancock St.; architect, I. D. Reynolds.

Ellery St., No. 204, s s, 150' w Throop Ave., three-st'y frame double tenement, tin roof; cost, $4,200; owner, Ernst Limmeroth; architect, T. Engelhardt, 14 Fayette St.; builders, Fuchs and H. Eich & Bro.

Floyd St., Nos. 318 *and* 320, s s, 400' w Lewis Ave., 2 two-st'y and frame tenements, tin roofs; cost, each, $3,000; owners, Straub & Kramer, Floyd St.; architect, T. Engelhardt.

Berkeley Pl., s s, 250' e Seventh Ave., 3 three-st'y brownstone front dwells., tin roofs; cost each, $10,000; owner, architect and builder, John Magilligan, 56 Berkeley Pl.

Floyd St., Nos. 232 *and* 234, s s, 100' w Throop Ave., 2 three-st'y frame double tenements, tin roofs; cost, each, $4,000; owner and builder, Fred Weidner, 170 Floyd St.; architect, T. Engelhardt.

Floyd St., No. 263, n s, 150' w Sumner Ave., three-st'y frame double tenement, tin roof; cost, $4,000; owner, Ernst Paul, on premises; architect, T. Engelhardt; builders, John Fuchs and C. Hoffmann.

Broadway, w s, 75' n Gerry St., 2 three-st'y frame tenements, tin roofs; cost, each, $4,000; owner and builder, John Rueger, 498 Broadway; architect, T. Engelhardt.

Gwinnett St., Nos. 138 *and* 140, s s, 175' e Harrison Ave., three-st'y double and three-st'y single frame tenements, tin roofs; cost, total, $7,000; owner, Henry Sauer, 140 Gwinnett St.; architect, Jacob Mesmer; builder, J. Shoet.

Eleventh St., s s, 288' 5" w Eighth Ave., two-st'y brick engine-house, tin roof; cost, $10,000; owner, City of Brooklyn; builders, Thos. Donlon and F. D. Norris.

Dupont St., No. 145, n s, 275' e Manhattan Ave., three-st'y frame double tenement, gravel roof; cost, $3,650; owner, —— Mason, 147 Dupont St.; architect, B. E. Lowe; builders, T. McHugh and J. A. Post.

Fulton St., w s, 40' s Clark St., six-st'y brick store, gravel roof; cost, $50,000; owners, Ovington Bros., Willow St.; architect, R. B. Eastman; mason, T. B. Rutan; carpenter, not selected.

Lincoln Pl., s s, 250' w Eighth Ave., 2 three-st'y brownstone front dwells., tin roofs; cost, total, $20,000; owner and builder, E. H. Day, 151 State St.; architect, M. J. Morrell; mason, J. J. Bentzen.

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A SINGULAR investigation has been begun in Washington, to inquire into certain accusations preferred against the present Supervising Architect of the Treasury Department. The burden of the charges appears to be the familiar one, that contracts for Government work have been awarded to persons not the lowest bidders, and in general the resentment of the complainants seems to be directed at contractors more lucky than themselves, rather than at the architect, but he, being a more shining mark, is naturally chosen for the first attack. Besides the allegations of unfairness in dealing with contractors, there are, however, certain specifications of practices still more objectionable; one story among others relating that under the direction of the Government, architect certain machinery and materials belonging to the Government, and valued at more than one hundred thousand dollars, were sold for fourteen hundred dollars, and subsequently bought back for seventy thousand. This has in times past been a common method of defrauding the public treasury for the benefit of dishonest officials, but a trifling mistake has apparently been made in this instance, one of the principal accusers of the architect having testified of his own knowledge that this occurrence took place under the administration of a former Government architect, who is particularly prominent in the present investigation. Owing, perhaps, to the embarrassment which such little mischances naturally occasion to modest men, none of the individuals who urged the investigation, and made the accusations, have appeared to substantiate them, so that the investigating committee sits idle, waiting for them. Apparently, it will wait in vain, for the most active among the witnesses already excuse themselves for their failure to comply with the summons of the committee by saying that the investigation will be a mere farce, and as they know more about the subject than any one else, we may assume that their prediction is correct.

THE provisions of the new building act now pending before the Legislature of New York are receiving much salutary discussion, and if the bill passes, as it probably will in some form, we may hope for a considerable improvement in what is already the most thorough statute of the kind in this country. Among the modifications of the present draft of the bill which are now urged, the most important is, perhaps, one which would allow the ends of girders to be built into brick walls with a simple plate under them to distribute the load, instead of the series of bond-stones which architects are now obliged to insert in the walls, at intervals of about thirty inches in height, all the way from the foundation to the underside of the girder. The objecting builders claim, and we are inclined to think with reason, that while such bond-stones may be useful in isolated piers, they are, in continuous walls, not only of no service in preventing the splitting of the masonry under the pressure, but are actually injurious to the strength of the wall, by reason, as we suppose, of the interruption which they cause in the bond, and of the inequality of settlement occasioned by them between the pier and the masonry on either side of it. There has always been something singular in the persistence with which the New York builders have clung to the practice of bonding brick piers with flat stones. In Boston, although they were required for a short time in the early days of the building law, their use has long been abandoned, and one who has occasion to observe the cracked and broken bond-stones which occur so frequently in New York buildings may be excused for doubting whether they are always of much value.

SOME of the New York papers have taken pains within a few weeks to disparage the system which is now so popular, of building large apartment-houses with capital contributed by those who are to live in them, under the form of a joint-stock company, as being much less advantageous to the owners of such buildings, in point of economy, than is generally supposed. Although there is undoubtedly some reason for this criticism, it is only fair to say that the cost of owning and living in such houses is in many cases artificially enhanced at present by circumstances not essential to the system. The mode in which the newest of the great apartment-houses in New York are built and carried on is a peculiar one. While in other places such structures are erected at the cost either of some individual who rents his rooms to tenants, or of a small association of mutual acquaintances, who own the property in common, in the metropolis the whole business of securing land, raising subscriptions, and organizing the company for building is usually transacted by a single person, the promoter, as he is called, who, if he is successful in his efforts, finds compensation for his trouble either in transferring the land secured by him for the building to the association at a price somewhat higher than that which he has contracted to pay for it, or in some other way. As the promoter needs a well-digested set of plans for the future structure, in order to interest the persons whom he wishes to have as subscribers, some architect is not unfrequently joined with him in the enterprise. Subscriptions are made for definite apartments, as shown on the plans, each subscriber agreeing to pay in cash about one-quarter as much as the same accommodation would cost in a separate house, the price of the apartments being decided beforehand by a careful allotment among them of the total cost of land and building, for which estimates have been already obtained. As soon as about two-thirds of the necessary amount is subscribed, an assessment is called, and operations are begun, and at the same time certificates of stock in the association are issued to the subscribers, each one receiving an amount equal to the price of the apartment which he has agreed to take. The stockholders then elect trustees to take entire charge of the property, and each one receives from the trustees a perpetual lease of his apartment, containing the conditions as to the use of the rooms, or the behavior of their occupants, which the subscribers see fit to impose on themselves for their own protection. The subscriptions rarely represent the total value of the property, a certain portion being raised by mortgage; but one or two floors of the building are generally reserved, to be rented by the trustees for the benefit of the association, and the income from this source pays the whole or a part of the mortgage interest. Other expenses, such as the cost of heating and service, are paid by the occupants, unless it should happen, as it sometimes may, that the rentals are sufficient to cover these also.

IT need hardly be said that it is more economical to combine fifty or sixty houses under one roof than to build them in a row along an avenue, and the great apartment-houses certainly offer many advantages to their owners in this respect. As it happens, however, such a mode of living is now fashionable, and the subscribers have generally been rich people, who wish to decorate their new houses to suit their own fancy. To meet this taste it is usual to contract for the building rather cheaply finished, and without mantels, arranging with the subscribers that changes shall be made to suit them, at a fair price, and it is easy to understand that many persons, who have money to spare, spend enough on such fittings to make the cost of their apartment considerably larger than the subscription. On the whole, however, this works to the profit of the more careful stockholders, whose dwellings gain a reflected distinction from their brilliant neighbors, and if nothing more serious is to be said against the new system, its popularity will be very little affected. On the other hand, the advantages which the best apartment-houses offer are very important.

Situated as they are upon Fifth and Madison Avenues, and on the Park, they furnish to the householder of modest fortune, but good social connection, a beautiful and comfortable home in the midst of all that is brightest and most attractive in New York, at a cost no greater than that of a shabby dwelling of the same capacity, but inferior in light, air and sunshine, in the dirty streets beyond the fashionable quarter, and in that city where the line between lavish opulence and prudent economy is somewhat unpleasantly drawn, the value of good location is not likely to be underestimated.

THE competition for the monument to be erected in Boston to the memory of Paul Revere closed on the first of April. Eight models were presented, of varying degrees of merit, and three of these have been selected by the committee in charge to receive the meed of three hundred dollars each which was promised. Although we are sorry to find that any respectable sculptor should be reduced to such straits as to be obliged to do work on speculation, for the chance of receiving one-fifth of its value, the character of the designs indicates that their authors felt the disproportion of the reward to the work, and contented themselves with mere sketches, appropriated in one or two cases bodily from some well-known statue, and left in the others with the smallest possible amount of that essential, though costly study which can alone bring forth anything worthy the name of art. Among the models, the size of which varies to an extraordinary degree, in view of the fact that the conditions required a uniform scale for all of them, the largest is one by Mr. D. C. French, the well-known sculptor of the statue of the Minute-man at Concord; and represents, like most equestrian statues, a man seated on a horse. The horse stands still, in a becoming attitude, and the man, who is distinguished from other men by a three-cornered hat, poses also decorously and monumentally. The whole is decent, creditable and commonplace. One wonders a little that the sculptor of the striking Minute-man should have subdued his ideas to so tame an expression, and the thought might perhaps enter into an undisciplined mind that Mr. French had made up, as it were, an equestrian model out of the stock properties of his studio, the triangular hat serving merely to give the proper flavor to what might, with the substitution of a fatigue-cap and a pair of huge moustaches, do equally well as a representation of the late King Victor Emmanuel at the battle of Magenta, and so on.

THE second "premiated" model, by Mr. Dallin, although much smaller, is of the same family as Mr. French's, the horse being apparently a near relative of that which has borne the bronze figure of Washington so many years on the Boston Public Garden, while his rider presents all the dignified ease of attitude which is so desirable and fashionable among equestrian statues. The third model, Mr. Kelly's, is as different as possible from the other two, and represents, not a mounted figure, but a horse and his master standing side by side. If the other models are tame and commonplace, this is all spirit. Decorum is a quality of which Mr. Kelly's horse and man have apparently never heard. Out of the six legs with which nature has gifted the pair, but three are on the ground, the rest are brandished in space. The horse's tail is bent at a right angle about the middle, and his mane shoots out on both sides of his neck at once, while the energy with which he paws the air is only rivalled by the recklessness with which his rider plunges at the stirrup. This model, lively and interesting as it is, has, as we think, the same serious fault as the other two which shared with it the equal premiums. While either of them might, with perfect propriety be labelled with the name of any Revolutionary hero, or might even, with a slight modification of face and raiment, stand for any cavalier known to history, Mr. Kelly's group suggests rather the story of Alexander and Bucephalus, than any exploit characteristic of the young silver-smith whose name it is desired to commemorate; and without some definite and intelligible purpose, it is needless to say that a statue, no matter how clever its design and execution may be, is of no more value as a work of art than a Chinese vase. The only model out of the whole number which seems to us to have been evolved from a real endeavor to enter into the story intended to be told is one now relegated to the lumber-room with the rest of the rejected. In this figure Revere is shown sharply pulling up his horse, who sinks back, not too gracefully, upon his haunches, while his rider, turning as he draws the rein, rests his left hand on the crupper, and reaches forward over the side of his horse, just as a man would to call a person at some distance on his right. There is no suggestion of Bucephalus, of the Spirit of Seventy-Six on Horseback, or of statuesque propriety in the model; it is simply a conception of a man riding on some errand which necessitates shouting at intervals to persons at some distance on the side of the road. Although expressed in a model which, while extremely clever in many points, is so hasty and unstudied as to have perhaps justly forfeited the regard of the committee, the story told is unmistakably that of Paul Revere, and of no other person whose history is likely to be represented in bronze in Boston; and while we should be quite disposed to uphold a jury in rebuking carelessness and haste, we cannot forget the insufficiency of the premiums, or avoid a certain regret that the opportunity to enrich the city with a statue possessing meaning as well as refinement should have been lost.

WITHOUT adverting to the remainder of the models, over which charity would draw a veil, we may mention that our prediction of last year, that none of the sculptors who should discredit themselves by competing for such petty premiums would be employed to execute the work, is likely to be verified. According to the newspapers, the committee values the models which it has obtained so cheaply at about the same rate as the sculptors who accepted the unworthy offer, and is now casting about for means of opening communication with those distinguished men who were not so reduced in purse or reputation as to contend for its prizes. Thus we are told that "a model is expected from Ball Hughes," Ball Hughes being a sculptor of local reputation, who knows enough not to throw it away in cheap scrambles. The committee, who have been "expecting" to be thus honored for a good while, will, it is said, respectfully await the leisure of the great man, who is probably astute enough to allow their anticipations to grow awhile before satisfying them; and unless he should be supplanted by some sculptor still greater, — that is, less inclined to work for nothing than himself, we imagine that he may count somewhat confidently upon receiving the commission, if the work should be carried into execution.

THE famous project of Captain Rondaire, for flooding the great African desert with water from the Mediterranean, although pronounced impracticable and useless by the Commission appointed by the French Government, has been revived again by the indefatigable Count de Lesseps. The careful surveys made by the French Commissioners showed, in their opinion, that Captain Rondaire had made mistakes in his levels, and that the Mediterranean water, instead of covering the Sahara with an inland sea, would merely fill a few marshy places near the coast. M. de Lesseps, however, after visiting the ground for himself, is satisfied that a canal cut from the Gulf of Gabes to the string of salt swamps on the southern border of Tunis, would not only overflow them, but would pour its waters over a great part of the waste of sand beyond. The cost of the enterprise, in his opinion, would be only about fifteen million dollars, and he has already telegraphed from Tunis an appeal to his countrymen to take immediate measures for raising the money. If subsequent investigations should confirm his views, there is no doubt that the sum he wishes will be easily secured. The interests of France in Africa are already so great that any practicable mode of extending them would be eagerly welcomed; and the opening of the whole interior of the continent to trade would be well worth the estimated cost.

A FORMAL announcement has been made that the East River suspension bridge will be opened to the public on the twenty-fourth of next May. Preparations have been begun for imposing ceremonies on the occasion; speeches will be delivered, and the custody of the structure will be formally handed over to the Mayors of the two cities of New York and Brooklyn. The people of the latter community seem to anticipate a great increase in the importance and population of their town as the result of the opening of the new highway, and it may well be hoped that their expectations will be realized. There is something singular in the difference of character which exists at present between New York and Brooklyn, the East River forming a barrier more effectual than many miles of distance by land, but if the bridging of the stream should serve to unite them in one great city the people of both portions of it will gain in many ways.

WATER-CLOSETS. — X.

PAN-CLOSETS.

ACCORDING to the definition given in Article No. IV, pan-closets include all that have a dish-shaped valve or pan at the bottom of the bowl. The pan is intended to hold a sufficient quantity of water to allow the bottom of the bowl, or a conical attachment to the top of the receiver (its base being uppermost), to dip into it below the water-line; in this manner a water-seal is formed. Except in rare instances the pan is intended to form the overflow. The receiver in this class of closets is necessarily large, and filth accumulates and remains in it. Sanitary authorities agree without an exception that pan-closets should never be used; but as they have been so extensively introduced in all parts of the civilized world, their description and history properly form a part of the literature of the subject which is under consideration.

I think the pan-closet was in use before a valve-closet was invented, as I do not find a single instance in the specifications belonging to the Patent Reports in which the pan is claimed as a novelty: on the con-

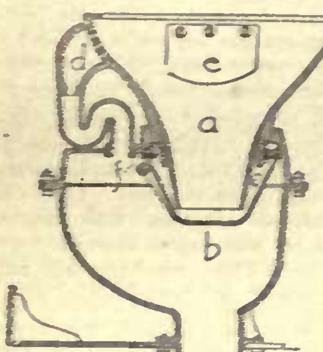

Fig. 95. — Section.

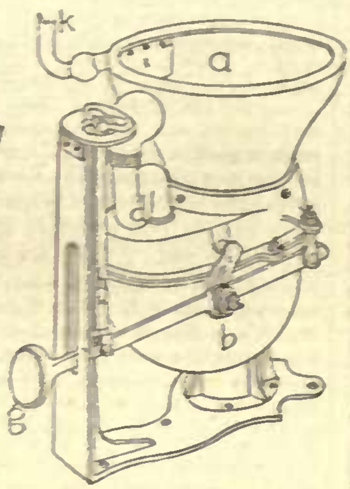

Fig. 96. — Perspective.

Tylor's Pan-Closet.

a, Bowl. *b*, Receiver. *c*, Pan. *d*, Overflow. *e*, Pan. *f*, Leather seat for pan. *g*, Weighted lever. *h*, Hand-pull. *i*, Slotted crank. *k*, Supply-pipe. *m*, Set-screws.

trary, the pan is always mentioned as if it were so well known that it would be unnecessary to describe it. This class of water-closet is, or was, as I do not think any one would use a pan-closet at the present time, usually connected with a trap below the floor. In this country the trap was usually a lead or iron siphon-trap, while in England one "container" of filth was added to a second filth accumulator, by joining the receiver to a D-trap.

The following descriptions will show how persistent have been the efforts of inventors and manufacturers to obtain some contrivance by which the container of a pan-closet might be kept clean and wholesome.

In the different trade-catalogues, pan-closets usually have the title "valve-closet" prefixed to them. This term, when applied to the pan, is a misnomer, but the term usually has reference to some form of supply-valve, and does not properly apply to the closet, as the sup-

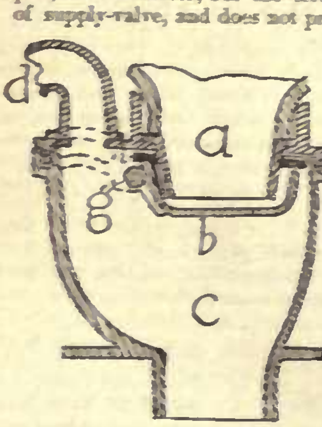

Fig. 97. — Section.

Details of Tylor's Pan-Closet.

a, Bowl. *b*, Pan. *c*, Receiver or container. *d*, Overflow. *f*, Leather seat. *g*, Spindle.

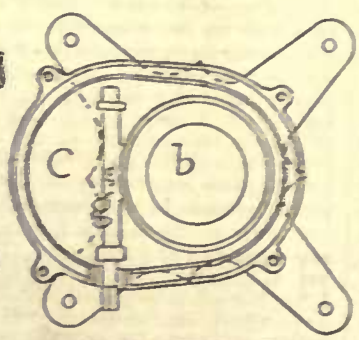

Fig. 98. — Container. — Plan.

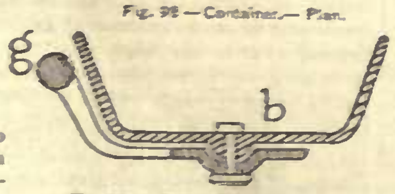

Fig. 99. — Pan. — Tylor's Closet.

ply-valve could be attached to other classes of closets with equal facility. Gases generated in the receiver may escape into the room when the pan is thrown back when opened, or through the hole in which the spindle works, as it frequently becomes loose. The bowl being generally placed on the receiver, a joint of putty or white and red lead cement is depended upon to keep it in position. This putty is generally full of cracks, the bowl being loose, thus allowing access for gas. The container of pan-closets requires an air-hole, and Hellyer tells us that in England this air-hole is usually left open and allows the smell to enter the room direct. There is little doubt that the days of pan-closets are numbered, and that in a few years, at most, we will never see them put into even the cheapest house. Pan-closets may be properly divided into two types, one in which the pan fits tightly against the bowl or projection, and the other and most numerous type where the pan is only intended to form a barrier to sewer-air by forming a water-seal.

Tylor's Pan-Closet. — The first mention of a pan-closet in which the pan was intended to form a water-tight joint was made by Edward Tylor, of London, in 1829. In the specifications he says: "this is similar to what is known as a pan-closet," and he claims as his invention the application of leather or other suitable material against which the edges of the pan or saucer (as he calls it) might have a seat and form a water-tight joint. Farther on in the specification he states, naïvely, that should the joint leak, even then it would be in every way equal to a pan-closet. In this closet is illustrated one of the early instances of a weighted lever. Modifications of this weighted lever have been in general use ever since, on valve and pan closets, to hold the valve or pan in position. The container and pan were made in different sizes and shapes, as is shown clearly by the illustrations that accompanied the specifications.

In this closet is seen one of the few instances, in closets of this class, of a separate overflow for the bowl; the pan fitting tightly makes it necessary. The bowl is fitted into place more securely than is usually the case with closets of this class, being set into a metal rim or collar, and held in position by small set-screws. The pan in some cases was attached to an arm that was joined to the spindle. By removing the bolt in the centre of the pan, the pan could be taken out without removing the spindle. The overflow would probably be siphoned by the sudden discharge of waste matter into the receiver.

Rogier & Mothe's Pan-Closet. — In France this class of closets has been in common use for years, and in some cases it seems to have been the intention to have the pan fit tightly against a metal rim. The device of Rogier & Mothe, illustrated by Liger in his work, has a pan balanced by a weight on the side of the axis opposite to the pan. When a certain amount of water had accumulated in the bowl, the pan would tilt and drop its contents into the receiver. In one case the weight forms a part of the pan; in the other instance the weight had an eye, to be placed over a hook on the rim of the pan. This closet is very much like Flament's closet in the manner of balancing the pan in the first instance and the valve in the second instance. This closet received a first-class medal at the Universal Exposition held in Paris in 1855. In the larger number of closets belonging to this class the pan is made fairly deep, and is only for the purpose of forming a water-seal at or near the bottom of the bowl.

Fig. 100.

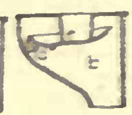

Fig. 101.

Rogier & Mothe's Closet.

a, Bowl. *b*, Receiver. *c*, Pan. *d*, Weight.

Hawkins's Closet. — In 1821, Stephen Hawkins, an Englishman, received letters-patent for a pan-closet on the same principle as the one just described, except in the latter case there was no intention of having the pan fit tightly against the bottom of the bowl. The weight is attached directly to the end of the pan, as in the case of Rogier & Mothe's closet, or it forms one end of a balanced lever, the pan forming the other end. These forms are shown in Figures 102 and 103.

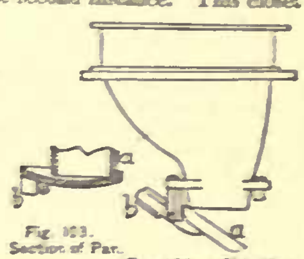

Fig. 103. Section of Pan. Fig. 102. — Side View.

Hawkins's Closet.

a, Pan. *b*, Weight.

Beachem's Pan. — In England, in 1825, Beacham invented a curious arrangement for holding a pan in position. This consisted of a band-spring enclosed in a cylindrical box; to this box was attached a short arm. On the end of the arm is a small wheel. This wheel pressed against and rolled on a hinged bar, to which the pan was joined. When the pan is pressed down by a lever or crank in the usual manner, the wheel would roll along the bar, the short arm would be depressed, and the spring wound up more tightly than it was.

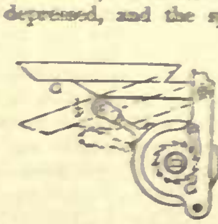

Fig. 104. — Side View.

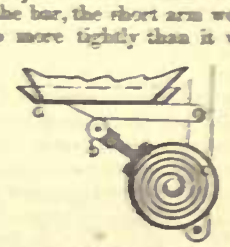

Fig. 105. — Section.

Beacham's Pan-Closet.

a, Pan. *b*, Wheel at end of arm. *c*, Spring in and attached to box. *d*, Rachet and catch.

When the pressure was removed from the lever, a contrary movement would take place, and the pan would be forced into position again by

the spring. If the spring should become weak, it could be tightened by a wrench to any desired tension, a ratchet-wheel and catch being placed there for that purpose. This was intended for use either on commodes or water-closets, but any one can see at a glance that there is too much mechanism in the receiver for practical purposes.

SPRING EXHIBITIONS IN NEW YORK. — I.

OLD HOSPITAL GHENT. BELGIUM.

THE Sixth Annual Exhibition of the Society of American Artists shows one hundred and fifty works out of several hundreds submitted for selection. Never before has the Society's need of a larger gallery been so apparent. There is none to be had in New York, however, save the South Room in the Academy building, and that, of course, is not available in the spring, when that institution is holding its own annual show. It seems as though the Society would have to cast about for means to obtain a gallery of its own if its future usefulness is not to be seriously crippled. It is poor, of course, and still "unfashionable,"—unable to claim assistance from outside wealth except upon the intrinsic grounds of its own plucky spirit and the good it has already accomplished for American art. Let us hope, however, that these claims will ere long work upon the sympathies of some generous amateurs of art, and that the association may find house and home. Some of us almost feel — more nearly than ever in view of the nature of this year's Academy exhibition, — that it would not be a serious loss if the Academy could be extinguished, and its premises handed over to the Society's keeping. This latter has grown so catholic in its temper with advancing age, is so much less wedded to the one particular style of art which at first absorbed its affections almost exclusively, that no good workman would greatly suffer by such a change. But such a change is, of course, impossible, and there seems an equal impossibility in the hope that the Academy will adjust itself to the newer temper of our art, or even of our public. We are probably doomed forever to see our best gallery — which is itself none too large and none too well planned, by the way,—filled with work that varies between bald commonplace and utter rubbish, here and there enlivened—at a good distance above the line—by a few excellent canvases.

The detrimental effect of close quarters upon the Society's usefulness is shown not only by the many good works which must every year be refused, but by the nature of those which are this year shown: most of them are small in size, the artists knowing well that when wall-space is so limited, the smaller a canvas the greater its chance of being hung. It is not, of course, desirable to rival the state of things existent at the Paris *Salon*, where a man must paint a colossal picture if he would attract much attention, and where one consequently sees nice little *genre* themes spread out over canvases big enough to decorate the Doge's palace; but to feel themselves limited to small work *only* is for our artists to be fatally cramped in their best powers.

Of course some observers find this exhibition better than any of its predecessors, while others call it inferior—especially to the very good one of 1881. As my own opinion I may say that while the general aspect of the room is not as harmonious or as striking as it was on that occasion, and while there seem to me more pictures on the wall that do not deserve to be there, yet the very best canvases are quite as good, if not better—and certainly more varied in their excellence—than they have ever been in the past. All pictures were voted upon by a committee of twelve, the decisions being twice subjected to reconsideration. Then the accepted pictures were hung according to the number of votes they had received—the most esteemed finding themselves upon the line and the few first favorites in the places of honor. Of course the effect of the wall is not as harmonious as it might have been, and of course certain pictures are hung on the line which would have been just as well seen at a distance, while others on the top row are lost to view; but no method satisfies every one, and if the hanging seems occasionally capricious we are somewhat consoled by the fact that it was done according to the averaged caprice of twelve men, and not of one or two. And we might think that even an offended artist would be somewhat silenced by this fact.

As I have said, a very catholic temper has been displayed by the committee. When we see one of Mr. Ryder's oddest harmonies on the one hand and one of Mr. Henry Smith's hard, detailed, mechanical yet not untruthful sea-views on the other, we need not complain of narrowness. The change in the character of the exhibition from its early predecessors is also very marked by the absence of mere studies of any kind. Good or indifferent, almost every picture is worked out to its logical limits. This fact deprives the exhibition of a certain sort of interest and charm to those who care about first ideas, methods, and aims; but it pleases the public, and there is no doubt that for an exhibition, as such, the change is in the right direction.

In portraits the collection is especially strong. There is, for example, Mr. Alden Weir's likeness of Mr. Richard Grant White—so good in character, so refined in feeling, so complete in workmanship, so gentlemanly as well as so accomplished, that it makes one think with exasperation of the way in which the fashionable public of patrons has during the past winter run after a foreigner, truly of some reputation in his own land and truly capable of getting a "striking likeness," but whose work is as far below Mr. Weir's in technical accomplishment as it is in delicacy of feeling. A portrait of a child by the same hand is good, of course, though by no means so excellent as the other. Mr. Brandegee sends a very clever portrait of a middle-aged woman, especially good in character, together with a group of a nude boy and black dog which is a most extraordinary descent. The boy is painful, the dog one of the most amusing caricatures I have seen in recent art. Mr. Eakins sends a portrait of his father, the well-known Philadelphia writing-master, bending over his work, in which the drawing of the foreshortened face and the rendering of the marvellously characteristic hands show all his accustomed strength. Mr. Montague Flagg sends the portrait of a young man, curiously colored, but yet truthful and ably handled. Mr. Irwin sends a good study head, Mr. Sartain a fine head of a Mexican or half-breed child, Mr. C. Y. Turner another clever study of a man's head, and Mr. Alexander the portrait of a young man,— hung too high for criticism. Then, after noting a very clever water-color portrait of an old lady by Mr. Wallace Sawyer, extremely free and fresh in handling, there still remain three women's portraits to be noticed, each of which is remarkable in its way, and a comparison between which well shows the versatility of our work. One is by Mr. Wyatt Eaton, a finely decorative three-quarter-length figure of a lady in white with pink roses at her belt, sitting in an arm-chair against a background of low-toned tapestry. The attitude of complete repose, with both hands resting on the arms of the chair, is pleasingly graceful, natural, and unconventional. The color is very attractive, and the handsome face rendered with such careful skill as to approach more nearly to the reprobated quality called "sweetness" than is usually the case with Mr. Eaton's work. Yet this quality is well escaped, I think, and the canvas is certainly a beautiful whole, — good as a portrait and most attractive as a picture. I saw no woman's portrait in the *Salon* last summer which could rival it in refinement of feeling and quiet skill of handling, though I saw many that attempted more brilliant results and achieved them sometimes, though with the loss of the high-bred repose and delicacy which make Mr. Eaton's work so satisfactory. When such a thorough Frenchman as Mr. Carroll Beckwith paints one of his actual fellow-citizens he makes her as Parisian, as dashing, as non-American as himself; but Mr. Eaton has a more truthful perception of character and of the essence of nationality in his sitters. Wherever we might meet this charming model of his we should know her for an American — and to thus paint in the national character, so to say, is one of the things for which we should be most deeply grateful to an artist.

From what I have just said about the *Salon* portraits of last season I should except one — which is not, however, really an exception, having been painted by an American and from an American sitter. This was Mr. John Sargent's portrait of a young girl, which figures again in the present exhibition. It was acknowledged on every hand in Paris as the one great success of the year in its own line. To say that with all its beauty it does not strike me as so *surprisingly* good as when I saw it there is merely to say that its surroundings are better and that one does not approach it after looking at miles of vulgar, meretricious, if brilliant and "stunning" portraits. The picture shows the full-length figure of a piquante, dark-haired girl, dressed in a black gown of stiff, antique fashion, relieved against a dull yellow background which scarcely indicates a curtain. One arm is bent, with the back of the hand resting on her hip. The other is extended with a boldly-devised, yet graceful gesture, and holds a white rose. Any lack of refinement in treating the face would have made such an attitude seem coquettish, or over-bold; but so daintily are the delicate features treated that the effect is only of youthful charm and frankness. In handling the work is superb, as free as may be, yet refined, never rough, careless, or exaggerated. There is much more restraint manifested, as was necessary with the subject, than Mr. Sargent showed in the "Spanish Dance" that has been so widely described. Yet there is almost as much brilliancy of touch and as much sureness of execution in every way. He is immensely clever, this young man; whether he will rank among the *great* painters of our time seems to depend only upon the question whether he will show himself possessed of more soul, of more individuality of feeling than he has as yet revealed. As a painter he has few equals at this moment. His master, Carolus Duran, never painted better, and to-day does not paint half so well; but that he has the gifts which go to make a great *artist* Mr. Sargent has not as yet revealed. We shall not quarrel with him or with fate if he never gives us anything more than splendid pieces, examples of brush-work and pictorial instinct; but yet we feel that he might perhaps give us all this and something more besides. If one wants, by

the way, a lesson in the peculiar quality called *style* — which no critic or commentator seems able to verbally define — let him compare this portrait with that of Mr. Eaton. The latter is more decorative, more reposeful — would perhaps be to some people a more agreeable daily companion, on this last account, after the first charm of novelty had worn away—but with all its skill and all its charm it is a trifle commonplace and cold next Mr. Sargent's. We can hardly formulate the difference; — perhaps Mr. Eaton does not assert himself enough, perhaps he does not sufficiently show the mood in which he worked, or the chief artistic aim he had in view. I cannot at all define it, but I think it is true nevertheless that Mr. Sargent's picture has *style* in a high degree — for modern work — and Mr. Eaton's has not.

The last remaining portrait is the most curious work of art I remember to have seen from an American hand, and I think also one of the very most remarkable; and it is a little odd to note that in spite of its curiousness, almost every observer, professional or lay, artistic or Philistine, learned or ignorant, holds the same opinion. Only the outermost fringe of the Philistines resent its strangeness and fail to see its beauty. It is by Mr. Thayer, whom my readers may remember as having painted many charming feminine portraits in past years, and last season the great picture of the year — the lovely portrait of a lady standing in a green velvet habit beside her horse. This present picture — again, (perhaps with Mr. Sargent's as a rival,) the great picture of the year — is very different in every way. In beauty of color, in perfection of execution, in all strictly pictorial ways it is very inferior to last year's canvas. It shows the half-length figure of a young girl, seated with her body in profile and her head turned so that she looks at us obliquely over her shoulder. The dress is white, the background vague and dark. There is little roundness of modelling. The handling is most peculiar; seen near at hand it looks as though it could not possibly produce a good result from any point of view. It is tormented, hesitating, crude in certain places, and — in its treatment of the pupilless eyes, especially — looks childishly inefficient, though not, of course, ignorant; but get away from it, and it resolves itself into vivid life and into one of the most marvellously expressive faces that have ever been put on canvas. I say *ever*, by the way, with full consciousness of the import of the word. The face is not exactly beautiful, except with the beauty of expression — but possesses that in a pre-eminent degree. It is mysterious, unfathomable, haunting, most impressive. The more one gazes, the more one is fascinated, and days after the impression retained in one's memory is as strong and peculiar as it was in presence of the canvas. To get so strong a result in any way with any possible technical method would seem a marvel; but to get it as Mr. Thayer has done seems incredible. It is said he worked at the picture off-and-on for two years in despair of fixing the peculiarly vivid expression of the model, and that even now he has not given it to his own satisfaction; but the observer feels that nothing could have been added, and wonders greatly to see such a marvellous result — the very final result and rarest flower of portrait painting achieved by technical means, which look as though the painter had not the slightest idea of what result he wanted to get or how he should go to work to get it. A more curious, more interesting, more fascinating problem I have never seen on canvas —and also very, very seldom a portrait of any time or school which, as a portrait, was so remarkable.

M. G. VAN RENSSELAER.

THE FIRE QUESTION.[1]

IT seems not a little remarkable that, while so many efforts are made by Governments and statists to ascertain the amount of the national wealth and its progressive accumulations, so little note should be taken of an element which is always working in conflict with such accumulation. Of all the elements warring against the accumulation of tangible wealth, fire is the most persistent. Earthquakes, floods, hurricanes, hail-storms, frosts, all occasion spasmodic destruction; but the destruction by fire is continuous, and almost seems to justify the belief that this is indeed to be the end of all things terrestrial. It is not every nation that is thus callous regarding the statistics of fire destructions. Speaking first of Europe, there is Russia —a country which it has become the foolish fashion to speak of as but half-civilized — which has a most complete system of fire statistics, all fires in each province being officially reported to the governor of such province, while their aggregate and certain special details are periodically transmitted to the central government. Of the returns so obtained an enlightened use is made; they are held to indicate the measure of political content or discontent which prevails, and, in some degree, the state of social prosperity. The last three years in Russia have marked a deep political convulsion: the destruction by fire has been greater than in any former period of the history of that country. The fires are abating; *ergo*, the discontent is dying out, or being crushed out — if discontent ever can be crushed out. For the purposes of this illustration, it does not materially matter what the process is — the fact alone is material.

In Germany, I believe, there are no statistical records of fires as such; but they appear in the Judicial Statistics in this manner: in every case where there is the least suspicion of fraud, or wilful fire-raising, an official inquiry is instituted, under the direction of the chief of the police, and the matter is sifted to the bottom, for the safety and protection of the general community.

In France, again, there are no direct statistics of fires; but under the wise provisions of the Code Napoléon — designation now changed to suit democratic notions — every man is held pecuniarily responsible for all damage occasioned to adjoining properties: and hence there is the risk of a double inquiry — first, at the instance of the insurance offices which cover the adjoining risks, and if suspicion arises, at the hands of the police. This wise law has led to many precautionary measures — solid, and almost fire-proof building being one.

I have next to speak of the United States. Here is a population built of all nationalities; and the proportion of suspicious fires has been, and is, prodigious. It is said that the nationalities of which the populations are mainly composed, is, in some degree, at least indicated by the relative proportions of fires.[2] The buildings, too, are constructed, in the newer towns more particularly, in a manner to facilitate sinister designs. This is unavoidable in new and rapidly settled districts. Yet the fire-underwriter there really selects his risks as much with a view to the moral hazard as to the physical or structural nature of the building. Further than this, the municipalities have organized and maintained fire-brigades, the efficiency of which is nowhere at all approached in Europe, and in comparison with which we are, indeed, far behind in this city. I make this assertion in the face of many and persistent denials; I make it with a full personal knowledge of what I am stating. A man there—speaking of the towns, of course,—must be skilled in fire-raising, or his designs will, perchance, be frustrated by the alacrity of the fire-brigade.

But notwithstanding these wise provisions, the want of detailed statistics regarding the destruction of property by fire, has been long felt. The deficiency has been in some considerable degree met by the enterprise of an insurance journal—the *Chronicle*, of New York; but private enterprise ought not, on principle, to be expected to perform national work. Accordingly, in the preparations for the census of 1880, measures were taken to obtain records of the property destroyed by fire during a period preceding the census, and in all the States of the Union. This department was put under the superintendence of a gentleman who had received training as an insurance expert, and I am looking forward with much interest to the publication of the returns. . . .

While surveying the practices of other nations regarding fires, we must not pass over China. Here the entire district is made responsible for the crimes of the district, of which wilful fire-raising is one of the chief. It may be remarked, in passing, that precisely the same principle applies in England regarding fires wilfully occasioned in connection with tumults, riots, or other incendiary burnings; the whole "hundred" is liable for the damage. Here the liability is limited to the extent of the damage occasioned. In China, the locality is subjected to the infliction of increased taxation in the way of fines; these induce vigilance.

It seems, then, that on an entire survey of the nations of the globe, Russia is the only country which systematically records the destruction of property by fire. Hence, in this regard, it is in advance of other nations.

The country where the largest proportion of the property is insured is France — three-fourths — Germany nearly the same, very much on account of schemes of compulsory State and municipal fire-insurance. The United Kingdom comes next, Belgium follows closely (43 per cent.), then Canada (30 per cent.), down to Russia with 9 per cent., of its property insured. The average of the whole world, as represented in this table, shows 43 per cent., or less than one-half of the insurable property is insured; while the average rate of premium is just over 5*s.* (0.27) per cent. . . .

Another manner of stating the case is, that the direct annual loss by fire, in the countries enumerated, is equal to the entire revenue of

[1] Extracts from a paper read by Cornelius Walford, F. I. A., F. R. S., F. R. Hist. Soc., Barrister-at-Law, before the Society of Arts, London, and published in the *Journal of the Society of Arts*.

[2] A comparison has been instituted between the populations of New York and Philadelphia, and the fires which have recently occurred in those cities. The population of New York is given at 1,400,000, and that of Philadelphia at 900,000. The fire loss of the former during the year 1882 was £840,120, while that of Philadelphia was only £433,840, or little more than half. But the comparison was still more unfavorable toward New York for the year 1881, when the fire loss of Philadelphia was only £315,146, and that of New York was no less than £1,150,000; and this disproportion of fire loss to population is in spite of the undeniable excellence of the Fire Department of New York. The total loss of property by fire in the United States was rather less during 1882 than during former years, but it amounted to about £14,000,000, so that New York bore more than one-seventeenth of the whole loss. In Philadelphia the insurance on the property burnt during 1882 was £1,438,730, or more than three times the amount of the loss sustained. — *Vide Times*, February 3, 1883.

the United Kingdom from all sources — approximating to seventy millions per annum. For this destruction of property arises notwithstanding the existence of fire-brigades, and the other appliances

	Fire Insurance Premium.	Rate of Insurance.	Ratio of Property Insured.	National loss by Fire.	Loss per Inhabitant.
	£		p. c.	£	*d.*
United Kingdom	6,000,000[1]	0.25	46	9,100,000	61
France	3,760,000	0.11	75	3,200,000	20
Germany	6,500,000	0.21	74	6,100,000	32
Russia	000,000	0.50	9	21,000,000	60
Belgium	400,000	0.10	43	500,000	22
Scandinavia	300,000	0.27	27	1,000,000	35
United States	11,600,000	0.90	15	22,500,000	105
Canada	1,550,000	1.10	30	4,100,000	230
The World	31,910,000	0.27	43	67,500,000	59

of watch-towers, fire-patrols, etc., in some countries, as, for instance, the United States, kept up at an enormous expense. If the cost of these be added to the annual losses, the sum of £70,000,000 is, perhaps exceeded.

I have given precedence, in the treatment of the questions involved in this paper, to the destruction of property, mainly because there are more facts concerning it available for consideration than there are with respect to the loss of life by fire — by fire in the sense here intended. There are elaborate statistics in the annual returns of the Registrar-General regarding the loss of life from burns, scalds, etc., mostly occurring to young children, and to females engaged in domestic occupations, by reason of the inflammability of their dresses. These, however, are not the deaths I am here referring to. In London, during the year just closed, there were 175 persons placed in serious danger of loss of life, by reason of the dwellings in which they were sleeping or working being in conflagration. Of these, happily, one hundred and thirty-nine were saved, and thirty-six perished. Every year presents some such record, alternating with greater or less loss of life, What occurs in London happens in other large, and in some of the smaller, towns; in these latter the life-saving appliances being less available than in London, Manchester, Liverpool, Birmingham, etc.

We have, happily, never had in this country any such catastrophe as that of the Newhall-house Hotel in Milwaukee, United States, recently (nearly one hundred lives sacrificed); or at the Circus in Berditscheff, Russia (nearly three hundred lives lost); or as at the Opera House in Nice, in 1881; at the Ring Theatre in Vienna the same year; or at the Brooklyn Theatre in 1876; yet tens of thousands of persons are exposed to be roasted alive in our theatres, music-halls, concert-rooms, churches, chapels, etc., every evening. But these are not the fires I have in view on the present occasion.

The risks to life, to which I now draw attention, are those which occur in the ordinary course of domestic life. A building is let out, say, in tenements. Shops constitute the ground floor; the upper floor consists of rooms occupied by lodgers. The shop is found burning; the families in the upper floors must escape as they best can, or they must burn to death. The whole point is, how did the shop become ignited? Was it an accident in the true sense of the word, or was it a premeditated fire? If the latter, where is the distinction between it and wholesale murder — called by the law manslaughter? Fires of this class seem to me to be ever on the increase. I much regret that the national statistics do not help us in this matter; and only trust that the familiarity with such records, as presented in the daily and weekly journals, do not tend to blind us to their sad significance.

The next important point which arises is, upon whom does the duty of protecting the lives and property of the inhabitants naturally fall? The consideration becomes momentarily complicated from the circumstance that in this country, and some others, the fire-insurance offices voluntarily assumed some portion of the duties of fire protection. It is to be presumed they did so, only because the then existing organizations were deemed insufficient for the purpose in view. The life-insurance offices have never considered themselves called upon to provide gratuitous medical attendance for the entire community, insured as well as uninsured. The prevention of fires, by which the lives and property of the public are sacrificed, is in truth a branch of national police, and is clearly a State or municipal duty, as much as protecting against thieves and burglars, by whom property is misappropriated and persons maltreated. The fact is, happily, becoming very generally recognized, and I will not dwell upon it. The arguments in support of this view are, in truth, unanswerable.

I regret to have to say, that since the municipal duty of protecting life and property against destruction by fire has been recognized, and in many cases adopted, the degree of protection obtained has been by no means commensurate with the necessities of the case. Here, again, indeed, I am not able to support my argument by a full statistical record — because no such general record exists; but there is one important piece of testimony available, and that consists of the returns of fires for the metropolitan district. On and from the first of January, 1866, the duty of protecting the metropolis against fire fell, by the authority of Parliament, upon the Metropolitan Board of Works. For this purpose, it took over the staff and appliances of the former London Fire-engine Establishment, which had been supported for many years by the fire-insurance offices taking London risks. . . .

In the course of thirty years, the fires have increased from 389 to 465 per million of the population, while the ratio of loss from fire to each inhabitant has increased from 6*s.* 10*d.* to 7*s.* 11*d.* per inhabitant. This does not take into account the lives annually lost.

The practical point we now have to consider is, what is the remedy? It is in the hope of arriving at a rational solution on this important point that I have presented many of the preceding details. I think all the necessary considerations are before us.

Our forefathers, in view of inculcating the sanctity of human life, ordained that whenever a life was wilfully taken, or sacrificed by any species of misadventure (short of absolute warfare) there should be forthwith instituted an inquiry. This was known as a Crown inquiry. Hence crowner, coroner's 'quest, or inquest. By means of such inquiry not only was the cause of death to be ascertained, but also, and more important, who was the offending person. This inquiry was in truth the first step in the direction of punishment. And adequate punishment is the most effective deterrent to the commission of crime.

Now, in regard to fires, I venture to say that none can occur in a crowded city without endangering life. If then life is so usually, and often so eminently, endangered by fires, ought there not rationally to be an inquiry into their origin? Now, inconsistently enough, as I think, there is no inquiry unless life be actually lost — no matter by how narrow a contingency the life was saved; no matter the indirect injury to adults, to children, to babes yet unborn, by fright and otherwise. In other branches of police, the consummation of the crime is not the only end regarded. If a burglar breaks into my house, the law assumes him to have contemplated a theft. If a drunken servant, or a negligent neighbor, causes a fire by which some property is destroyed, and life certainly endangered, the law is entirely indifferent concerning it. This is an instance of the illogical mode in which we are governed. There is no doubt a common-law liability as against my neighbor if he carelessly destroys my property; but he may put my life in jeopardy, and walk away without being challenged for, of the two, the much more serious offence. Is it not time for the people to declare that they can tolerate this stupidity of legislation no longer?

No doubt there has been hovering round this question a sort of sentimental feeling that an inquiry indicates some suspicion of crime; but in the cases of railway accidents, colliery explosions, shipwrecks, and now, happily, in respect of steam-boiler explosions, are not Board-of-Trade inquiries instituted in the public interest? Yet I may nightly run the far greater peril of being burned in my bed, and if I chance to escape, the miscreant who thus placed me in jeopardy escapes in cold blood.

The prevailing causes of fires in the case of dwelling-houses are unquestionably (1) carelessness, and (2) wrong-doing. Carelessness embraces the sins of the original builder, and of those engaged in subsequent alterations and repairs; negligence of servants in regard to gas, fires, lamps, matches, and explosive and inflammable substances, which enter into domestic use. In business premises, warehouses, etc., the nature of the commodities stored often causes additional hazard. The wrong-doing consists of fires purposely created from feelings of revenge, to conceal thefts, or, too often, for the purpose of defrauding the insurance offices. As to the former, there ought to be a remedy against the offender; as to the latter, they are crimes of the deepest dye. How are the circumstances and motives leading to the fire in each case to be determined, except by means of a careful and systematic inquiry? If any disgrace be attached, it can surely only be against him who either so negligently controls his household, or so recklessly conducts himself, that he dare not face such an investigation! . . .

The conclusion at which I have arrived, after years of careful consideration, and not a few opportunities for observation, in this and other countries is, that in every case where the cause of fire is not so clear that the chief of the fire-brigade, or other competent person to be named, can certify it in writing, there should be forthwith instituted a formal inquiry into the circumstances of the case; and the result of the inquiry should be transmitted to the public prosecutor or his district deputy, and also made known by a local record, by means to be determined.

I do not propose on this occasion to enter into the controversial question of whether the district coroner, the chief of the police, or a new county officer, appointed for this and other purposes, or this purpose alone, shall be the person to conduct the inquiry. All I contend for is, let there be an inquiry, and take care that it is not a sham, by means of which fraud or culpable negligence may be concealed, instead of being openly and fearlessly exposed. The object of the inquiry is to stay the hand of the wrong-doer, by making the chance of detection reasonably certain, instead of, as now, almost impossible. During the past few years, the necessity for more vigorous action in regard to doubtful, or worse than doubtful, fires has forced itself upon the fire-insurance offices, and the result has been a considerable number of convictions for arson, and attempted burnings;

[1] The actual premiums received by the British fire-offices approximates to £10,000,000 annually; but that includes the sum received for insurances in other countries, and for the purposes of this estimate it is necessary to give each country credit for the entire sum paid by it in insurance premiums, quite irrespective of the nationality of the compaules by whom the insurances are effected.

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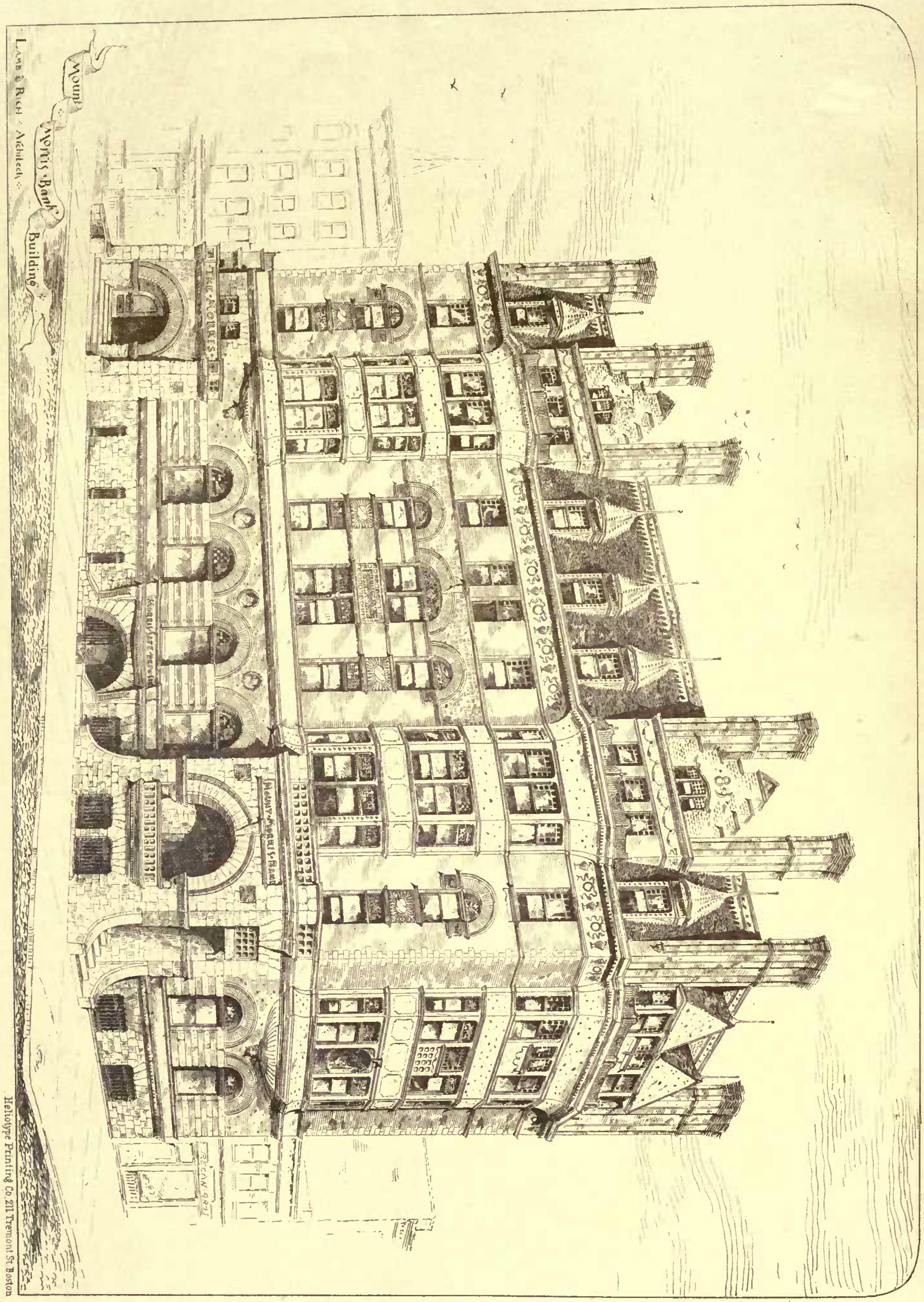

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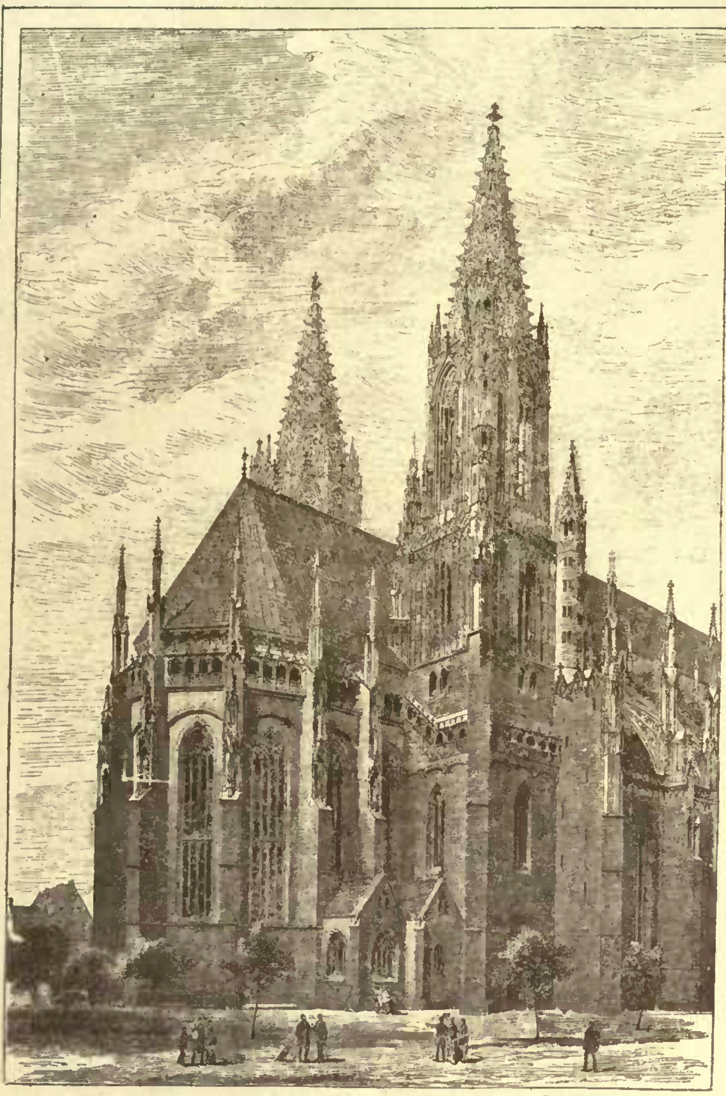


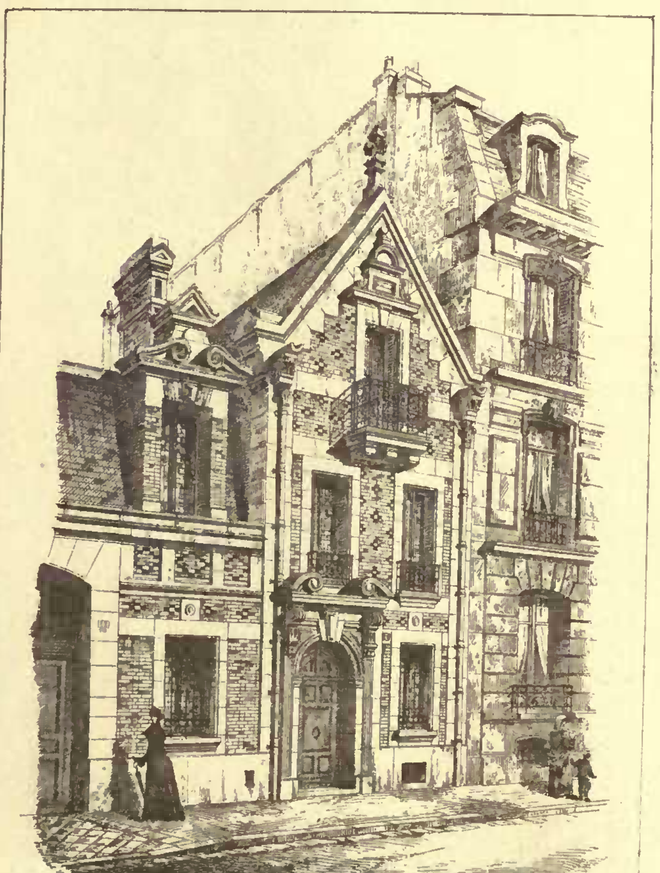
THE BUILDER, FEBRUARY 17, 1883

ULM CATHEDRAL, IN COURSE OF RESTORATION.—Exterior of the Choir

"AND THE SEA GAVE UP THE DEA

DESIGN FOR A PORTION OF A PROPOSED DEC

BY SIR FREDERICK LEIGHTON PRESIDENT



HOTEL, RUE DUMONT-D'URVILLE, A PARIS. — Architecte : M. Tronquois.

LA SEMAINE DES CONSTRUCTEURS.

OUR FOREIG

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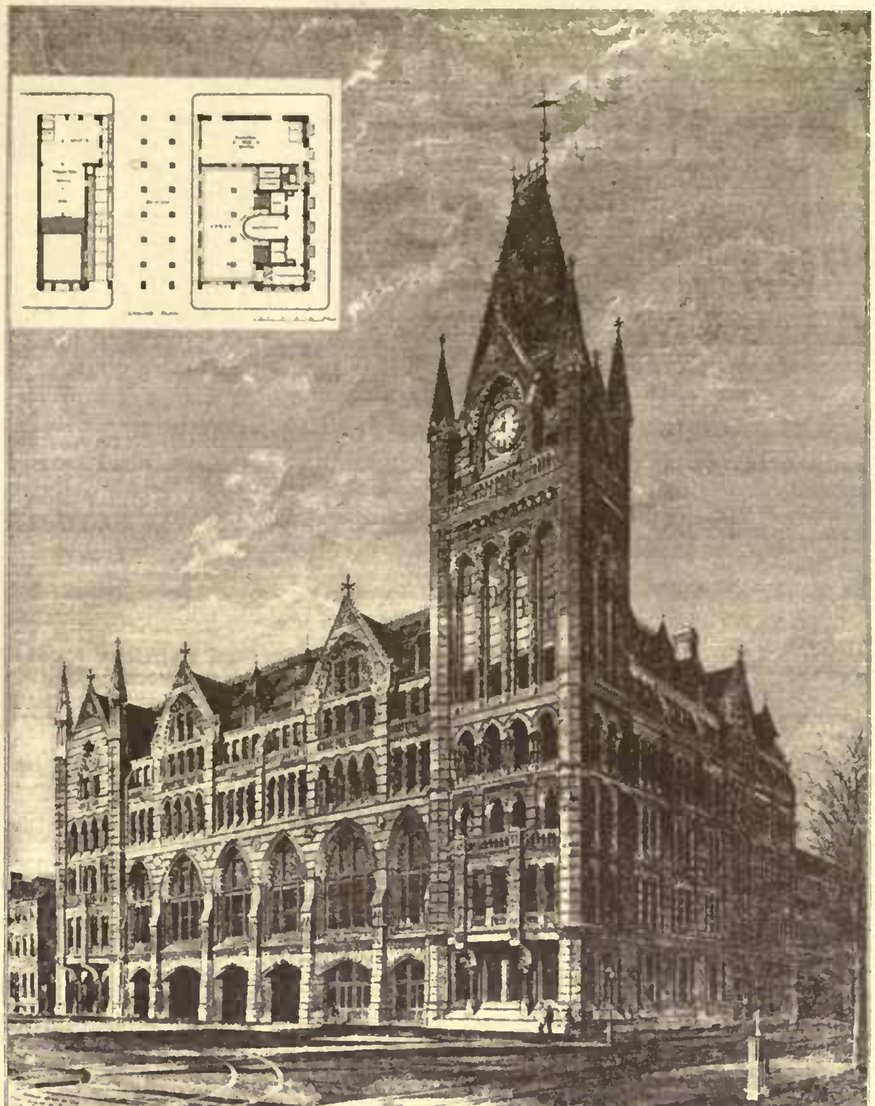
The Architect.

HICH WERE IN IT

ON IN ST PAULS CATHEDRAL

ROYAL ACADEMY



PENNSYLVANIA RAILROAD PASSENGER STATION
BROAD STREET PHILADELPHIA

The Building News

The British Architect.

HOTEL COMMUNAL D'ANDERLECHT · FAÇADE PRINCIPALE VERS LA PLACE DU [illegible]
M. VAN YSENDYCK ARCHITECTE

Moniteur des Architectes

EXCHANGES. XIV.

211 Tremont St Boston.

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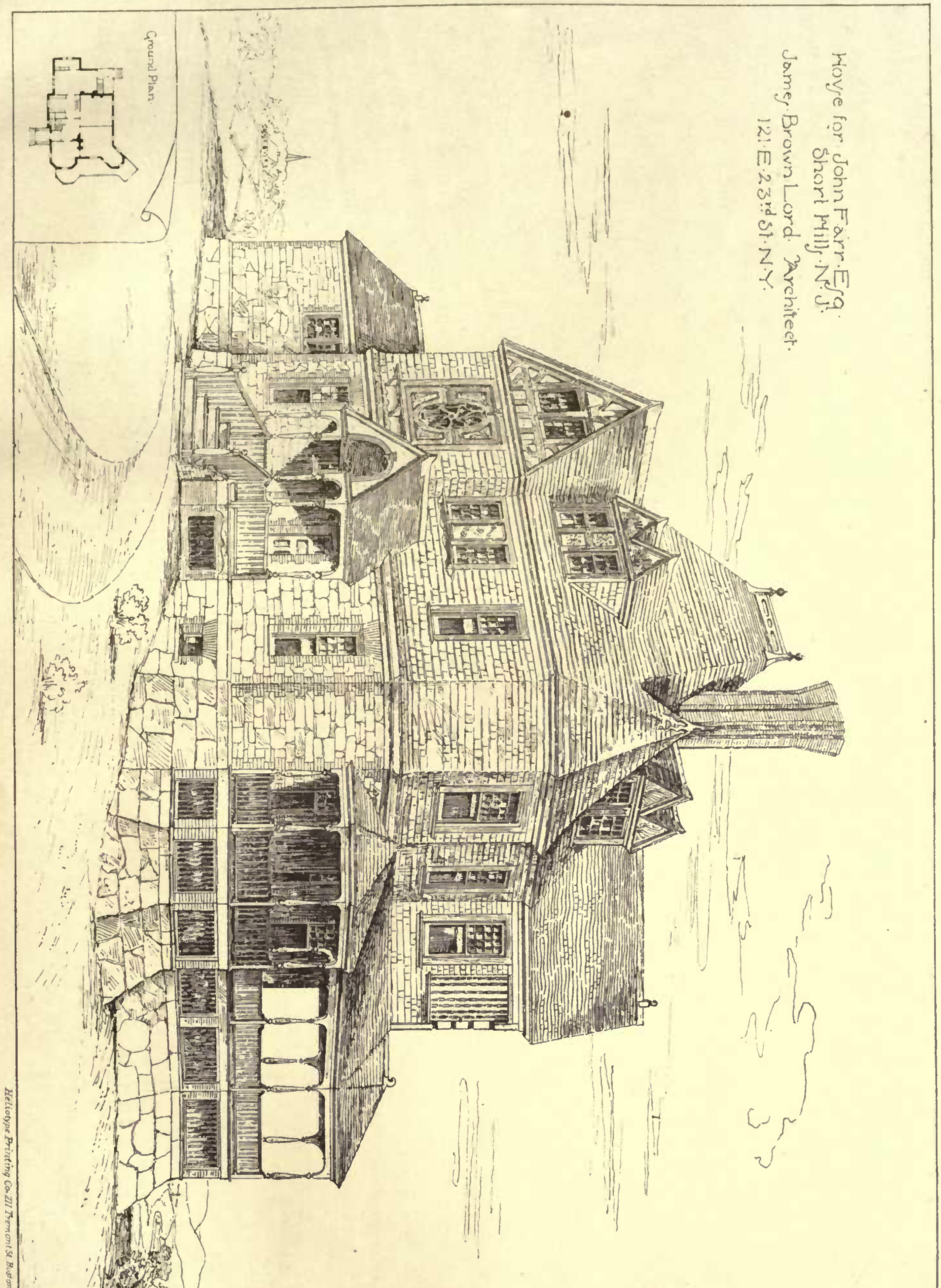


but I still assert that not one-tenth of the fraudulent burnings are, or can be, brought to light in the absence of certain and independent inquiry. Is it not notorious that hotels which do not pay; that theatres which do not fill; that cotton and other mills, when manufacturing interests are depressed, always burn? In the United States, the melancholy fact has become concreted into the ever apt expression of "Selling out to the insurance offices." But in such cases the insurance offices are not the voluntary purchasers, and further, the losses are all borne by the general public.

THE ILLUSTRATIONS.

ULM CATHEDRAL AND ITS RESTORATION.

[From the *Builder*.]

At a time when in artistic circles in England no small interest has been roused by the report of the condition of one of our noblest monuments of ecclesiastical architecture, and when an appeal is being made to the public to defray the necessary expenses that will be incurred by the demolition and restoration of the tower of Peterborough Cathedral, there reaches us from Germany the news of the growing interest that is there being expressed in the scheme at length fairly on foot for the completion of Ulm Minster, the largest Protestant church in the world. Now that the last stone has capped the western tower of Cologne Cathedral and a great national work has been accomplished, the long sadly-embarrassed works of the termination of the great cathedral at Ulm have been promised the interest and co-operation of the Government; the German Emperor has authorized the formation of an important lottery, the proceeds of which are to defray the necessary expenses of a work which, as a national undertaking, is of only secondary importance to that of Cologne. It can well be understood how favorably such a scheme has been received in Protestant Germany. . . .

Ulm Cathedral, one of the famous Gothic minsters of Germany, has for centuries remained like so many other Continental churches, incomplete, while the religious zeal and intolerance of the past have only further assisted the destructive action of time. Ulm, the home of a wealthy *bourgeoisie*, in the enjoyment of a singular degree of freedom, was, in the Middle Ages, one of the richest cities of Europe. "*Ulmer geld regiert die Welt*," said the proverb which coupled the name of the city with those of Venice, Nuremberg, Augsburg, and Strasburg. That civic pride which has ever been one of the most powerful aids to the development of art led to the determination on the part of the burghers to possess a great cathedral, though it would seem, as so often happens, that the existing result of this praiseworthy conception far exceeded the original plan. A century after the first stone of the west front of Cologne Cathedral had been laid, Burgomaster Krapt, in 1377, laid the foundations of the Ulm Minster, and for many years the works steadily progressed, an army of stone-cutters, masons, and other hands being employed, the expenses defrayed out of town dues and other municipal taxes. In 1392, mention is made in the records of a master, Ulrich von Ensingen, engaged to be *Kirchenmeister*. It has been suggested that the Ulrich von Fissingen who, in 1394, was called to Milan to give his valuable advice in respect to the cathedral works, was no other than the above-mentioned architect. Five years later we find him engaged on the Strasburg Cathedral, where he died in 1419. To Ulrich von Ensingen has been attributed the change of the original plan of Ulm Cathedral, and the enlargement of the conception to such as it stands in the present day.

Throughout the whole of the fifteenth century the works progressed rapidly, the beautiful choir-stalls of Jörg Syrlin,—casts of which may be seen at the South Kensington Museum, — as also several of the painted windows by Hans Wild, the wonderful *ciborium*, and a number of wall-paintings, all belong to the active period when Ulm was a brilliant artistic centre. . . .

With the fifteenth century ceased the active progress of the cathedral works. Wars and commercial ruin had sadly robbed Ulm of its former wealth; the religious ardor which had raised in mediæval days such temples as still excite the admiration of the world was, if not dead, greatly changed in its character; a new spirit had arisen, the Renaissance with its distaste to "barbaric Gothic," its new aims, and its powerful allies, the printing-press and the Reformation. The Reformation particularly affected Ulm, which early in the movement deserted the faith of its fathers, and with that fanatic zeal and intolerance which characterized, as, indeed it still does to some extent, a section of the Protestants, a large number of beautiful works of art were destroyed throughout the city, rich in Roman Catholic relics. The cathedral, itself sadly mutilated, remains almost alone now to tell of the days of Ulm's mediæval prosperity. Later centuries did little to complete the great Minster. Germany was too sadly torn by the horrors of war to devote its time and hard-earned pence to details so eminently the work of peaceful and prosperous years, and so with slight additions the cathedral came down to our times, its great tower rising like that at Mechlin, square and squat, awaiting the final touch which will now, at length, be put to it. With the early years of this century what interior pictorial beauty still remained was further obliterated under a generous coat of "clean, wholesome whitewash," specially intended to cover from public gaze the series of wall-paintings which were accused of superstitious and barbaric ugliness. When only three or so years back the whitewash was removed, several interesting wall-paintings of the fifteenth century were brought to light, and now form no small feature in the interior decorative effect.

The restoration of Ulm Cathedral cannot be said to date from yesterday. Primarily it may be traced to the first projects set on foot for completing Cologne Cathedral. As far back as 1841 a society was formed in Ulm, with the King of Wurtemberg at its head, and the chief aim of which has now been for hard on forty years to patch up the sadly mutilated old monument. Professor Grüneisen's little work on "The Art-Life of Ulm in the Middle Ages," to which we have referred, was one of the first publications of the Society, which, by 1814, had gathered sufficient funds to undertake the work of restoration. In 1814, under the direction of Professor Mauch, of the Stuttgart Polytechnicum, and Baumeister Thrän, operations were commenced, and the more urgent repairs taken in hand. Thrän died in 1870, and was succeeded in his post by his pupil Seebold, who, however, died only a year later, his place being filled by Ludwig Schen, a pupil of the Gothic master, Egle. Considerably over half a million of florins had been expended, largely contributed to by the inhabitants of Ulm, but funds were still sadly wanting. A lottery was organized, and the restoration of the interior was commenced. In 1877 the five hundredth anniversary of the foundation of the cathedral was commemorated, and three years later, at the Congress of Architects, held at Wiesbaden, it was unanimously resolved that the completion of the Ulm Cathedral should succeed that of Cologne Cathedral. Early last year the German Emperor gave his assent to the formation of a national lottery for the purpose. The architect Schen had, however, died in 1880, a martyr to his devotion to the work, and Professor Beyer, another of Egle's Gothic school, succeeded him in his post as Baumeister. A committee of eminent architects, among them Oberbaurath Adler, of Berlin, Professor Bauschinger, of Munich, Oberbaurath von Egle, and Professor Laisgle, of Stuttgart, Oberbaurath Funk, of Cologne, Oberbaurath von Ferstl and Oberbaurath von Schmidt, of Vienna, consulted on the feasibility of completing the huge tower, gave their entire assent to the project, and now the work may be said to be fairly on its road towards completion. Poets are prophets. Goethe a hundred years ago pictured the day when the birds would shelter themselves in the great tower of the cathedral, "God's tree" rising high into the air for eternity *für die Ewigkeit*. Even in its maimed and incomplete condition, the huge cathedral stands proudly like a giant above the houses of the picturesque old town, for Ulm, if not as quaint as Nuremburg or Schaffhausen, is still singularly an honest burgher town of the Middle Ages.

Architecturally, Ulm Cathedral in its ground-plan may be classed as belonging more especially to the purely German Gothic system of a nave and side aisle, each terminated by a separate polygonal choir, — a plan differing, it will be remembered, from the older and simpler type of Cologne or Freiburg, which are regarded as being built more peculiarly according to the French rules. In the different types of the basilica and the *Hallenkirche*, the one with its obligatory clerestory, the other without, it is to the former that Ulm belongs, yet differing again from the Strasburg type with its saddle-back roof in having a highly-pitched roof (known to the Germans as a *Pultdach*), obliging a series of flying buttresses connecting the central nave with its aisles, a feature which adds no small element of picturesqueness to the general effect. The original plan was further altered in the sixteenth century by the duplication of each side aisle by a series of slender columns, the cathedral thus possessing in reality five aisles, producing, as may be imagined in so large a structure, an effect of great impressiveness. The dimensions of the Ulm Cathedral are indeed only exceeded by those of Cologne.[1] Exteriorly the ogive portal, cruelly as it has been mutilated, is still an object of great beauty, combining in its details some earlier work of the thirteenth century, introduced from the original parish church which the cathedral superseded. Interiorly, though criticism may light upon the late Gothic character of the many details, it is impossible to deny the imposing character of the general effect. Scattered in various directions are many of the original interior decorations which have happily escaped the mutilations of the past. Foremost among these stand the superb series of forty-eight choir-stalls, the work of Jörg Syrlin, executed, as the inscription notes, between 1469 and 1474. In the history of Renaissance art this work holds a high place, stamped as it is with the classic spirit which so pervaded the great revival. Classic philosophy and mythology and Biblical history find united their expression in the subtly carved heads of Cicero, Pythagoras, Seneca, and Quintilian, in the allegory of the coming of Christ, mingled with the figures of the Sybils and the great Prophets of the Old Testament. Little wonder is it that tradition should have attached to the name of the artist a legend — resembling that told of many other famous artists — that the

[1] The area of Cologne Cathedral is 6,200 square metres; of Ulm, 5,100; of Strasburg, 4,100; of St. Stephen's, at Vienna, 3,200; of Freiburg, 2,960; of Ratisbon, 2,400. The height of the nave at Cologne is 44 metres; at Ulm, 42; at Ratisbon, 33; at Strasburg, 30. The breadth of the nave at Ulm, 15 metres; at Cologne, little over 13: as also at Strasburg. The west tower of the completed Ulm Cathedral (according to Boblinger's plan) will rise to a height of 151 metres (495 feet); while those at Cologne are only 148 metres high. The Ulm tower at present is only 334 feet high.

Benedictine monks of Blaubeuren, in whose convent Syrlin has left some of his best work, should have put out his eyes, so that he should not produce for any other convent such admirable creations. The South Kensington Museum, as we have already remarked, possesses an interesting cast of Syrlin's choir-stalls in Ulm Cathedral. The stone pulpit by the second pillar in the nave is a scarcely less decorative work, the cover carved by the younger Syrlin. To the left of the choir stands the *ciborium*, rising ninety feet into the air, a masterpiece of sculpture, — tradition has stated it to be of "molten stone," — long believed to be by Adam Kraft, of Nuremberg; but the work of the so-called "master of Weingarten," who in 1469 executed the work for the pious Engel Zaringerin. Mention of the fifteenth-century painted windows of Hans Wild should not be forgotten; nor the font erroneously attributed to Syrlin, and only contemporary with him—it bears the date 1470. It shows, however, the skilful and suggestive use made by the late Gothic artists of heraldry for decorative purposes.

The restorers interiorly have been actively at work, the vestibule of the nave with its modern stained-glass windows, is an eminently convincing proof, while the great organ, built in 1856, is always shown to visitors with pride as the largest in Germany — it contains one hundred stops. Exteriorly, the work of restoration has been carried even farther, in spite of the deficient funds at the disposal of the architects. Now, however the work will be taken up with renewed spirit, and if there are some who may regret the changes, the honest burghers of Ulm, and with them Germany at large, will be proud to show their great cathedral completed. Rumors have reached us from Strasburg, where the cathedral also remains spireless, that more than one good citizen is opposed to the change of the old pile and the forms which have been so familiar for many a generation. Doubtless there will be many in Ulm to express the same feelings, as there were in Cologne, but when national pride steps in, private predilections, however cherished and worthy of respect, must give way. Ulm Cathedral must be completed, and with the funds which will soon be placed in the hands of the authorities the work will progress merrily. Once more a picturesque pile of airy scaffolding will break the horizon of the Swabian landscape as it did in the busy mediæval days when Ulm was very different to the quiet provincial town it now has become, when its armies of workmen tramped through the streets to and from their work, and the noise of many-hammered trades was hushed to silence as the *angelus* pealed over the roofs of one of the great and wealthy cities of mediæval Europe.[1]

RAMBLING SKETCHES BY MR. T. RAFFLES DAVISON. — A VISIT TO A WEST COUNTRY ART-WORKER'S.

[From the *British Architect*.]

In some ways Mr. Hems, of Exeter, may claim special distinction. Seventeen years ago he was a journeyman carver: now he holds a position in the very front rank as a master-carver, and employer of a large number of hands. His work is now known as amongst the very best of its kind in the country, and he supplies church furniture, with all kinds of carving in wood, stone, and marble, to all parts of the world — perhaps excepting Kamschatka and Northern Siberia generally. Seventeen years ago, I believe, Mr. Hems would own to nothing but his brains and skill; now he possesses one of the best workshops anywhere to be seen, whether for its internal usefulness or well-proportioned exterior effect, and troops of skilful workmen engaged in carrying on for him a large and successful business. Then all this may be fairly credited to his own energy and talent, without the aid of capital, which now seems a necessity to all successful enterprises. In this light it may afford an example and encouragement to many. By his indomitable pluck and amazing industry Mr. Hems has made his special skill and knowledge of carving and ornament to give a good account of themselves, and procure for him house, lands, workshops, and business, such as are an enviable reward to toil. Several illustrations of the skill of our "West Country Art-Worker" have appeared in the *British Architect*, and to all who have seen them, some notice of his home, studio, and workshops at Exeter will be welcome.

The buildings which Mr. Hems has erected and christened "Ye Luckie Horse-shoe," were designed by Mr. R. Medley Fulford, F. R. I. B. A., of Exeter, and to my mind that side of them which faces "Fair Park," the home of the proprietor, is an excellent embodiment of the simplicity and dignity best attendant on such a building. The front is more elaborate, and is considerably broken up by various lines of piers, beams, strings, and decorative accessories, but it is very picturesque, and is a compliment, I suppose, to the good people of Exeter, for it is certainly one of their best modern street buildings. It is worth noticing, too, that this same street frontage is the fulfilment of a promise made by Mr. Hems to one of his candid and sarcastic friends, who bantered him pretty roundly about an old horse-shoe he picked up on his arrival at Exeter in 1866, and nailed over his door for luck. It was particularly promised to this friend that the said horse-shoe should be fixed in front of one of the best buildings in Exeter; and here it is, mounted on a Corsehill-stone shield in the centre, with the sign of Hems's ancestry below, I. X. L. That is how it is that every little boy or girl in the ancient and "ever faithful" city can tell the stranger without hesitation in a moment which is the direct way to Harry Hems's "Luckie Horse-shoe."

[1] We recommend to those interested in the subject of Ulm Cathedral, Herr Pressel's work "*Ulm und sein Münster*," and also his interesting account of the cathedral which appeared, fully illustrated, in the Leipzig *Illustrirte Zeitung* of January 6, of this year.

I have taken no liberty whatever with the surroundings, for every tree exists as I have shown it, and on the lawn at "Fair Park" are many more.

As to construction, the walls are of local red bricks, with warm Dumfries stone (Corsehill) dressings. The roof is covered with Wilkinson's strawberry-colored Broseley tiles. The wood-work of the main front is of teak, sturdily built. Each floor rests upon stout iron flitch-girders, which are nutted on the exterior with ornamental wrought-iron ties, after the fashion so general in Bruges and its neighborhood — a happy and characteristic feature. Much of the ground floor, being used by statuaries for the working of stone and marble, is open-arcaded on the side facing the yard. The front portion is used as a show-room for finished work prior to being sent off — and that simply, as no goods are made on "spec," everything being "ordered" first. The floor of this part and of the vestibule are of Maw & Co.'s encaustic tiles. On the first floor is a large shop, some one hundred feet long, devoted to skilful workers and carvers in wood, to the offices, and to Mr. Hems's private studio. Here no cost has been spared; the walls are panelled in wainscot oak; the windows are of teak, the glass therein being cleverly painted by Messrs. Fouracre and Watson of Plymouth. The fireplace has a "country parson" stove, hearth, etc., of old blue Dutch tiles. The over-mantel, in the main, consists of a finely carved and ancient wooden representation of the Royal arms (A. D. 1630). It is local work. Beneath is the motto, "Work whilst it is called to-day, the night cometh when no man shall work." Here I may remark that the very folk who do *not* need mottoes stick them prominently up for their every-day perusal.

On the third floor the modelling and the figure-work is done. This portion, like everywhere else, teems with models of saints and of animals, of figures and of foliage, together with innumerable old examples of mediæval work — a veritable architectural museum of the most interesting character.

And now a few facts about "Harry Hems," as he is familiarly known. Born and bred in London — serving a seven years' apprenticeship in Yorkshire — leading a Bohemian life in many parts of Great Britain, and the Continent afterwards — he went to Exeter to carve the new Albert Museum there, just seventeen years ago. Beginning a business on his own account, with very small things, as the work increased so the shops grew bigger proportionately; until in 1881, close by the central part of the city the present extensive premises have been built. Whilst the workshop is one large architectural museum, in which, on wall and beam, at every hand are old samples of ancient work, or plaster casts of such, the residence at "Fair Park" is altogether a curiosity shop; the walls have been, under Mr. R. Medley Fulford's supervision, painted in distemper; and thereon, and in every cabinet, and at every corner, are hung, or arranged

> Old records writ on tomb or brass;
> Old spoils of arrow-head and bow;
> Old wrecks of old world's overflow;
> Old relics of earth's primal slime, etc.

Amongst all these, many a pleasant hour might be profitably spent.

Mr. Hems has carried out carved work or sculpture, or made stalls, pulpits, fonts, reredos, or other fittings for nearly a thousand churches and important public buildings. At the Centennial Exhibition at Philadelphia, 1876, he was the only British exhibitor awarded a medal for sculpture or carved fittings — he had one for both. At Paris, 1878, he was awarded honorable mention, and at numbers of local and minor exhibitions he has won medals and prizes. *Both* his grandfathers (paternal and maternal sides) were awarded medals at the Great Exhibition of 1851. As his work has increased a large staff of art workmen has gradually collected, and now, amongst "Harry Hems's merrie men," are to be found some of the pick of the west country, north country, Londoners, Germans, and Frenchmen, who represent the trades of sculpture, carving, modelling, joinery, and masonry, whilst they have been working "overtime" for the last twelve years! In the wood-working, mitring — the joiner's delight — is unknown; all work is butt-jointed, and in place of nails or screws oaken pins are used; all the work is left from the tool, and sand-paper prohibited.

The skill of the wood and stone carver is well enough appreciated now-a-days, and the best kind which we can avail ourselves of has to be drawn upon for the finishing and adornment of our buildings; there is, therefore, every opportunity for the success of such a business as this when it is in energetic and able hands. What chance it will have when our ladies have passed through several sessions of "wood-carving classes," and "know all about it," one may well shudder to contemplate.

DESIGN FOR A PORTION OF A PROPOSED DECORATION IN ST. PAUL'S CATHEDRAL.

[From the *Architect*.]

We are enabled to reproduce the design by Sir Frederick Leighton, P. R. A., forming part of the proposed decoration of St. Paul's, which appeared in the last exhibition of the Royal Academy. It will be remembered that Mr. Poynter, R. A., contributed to the same exhibition a large drawing representing a segment which comprised one-sixth of the dome, and from which the proposed arrangement of the decoration could be understood. The dome will be divided into eight parts by upright architectural ribs. In each

space between the ribs will be two large round panels, twenty feet eight inches and twelve feet eight inches in diameter respectively. Round the base of the dome and supporting the circular panels will be eight thrones or architectural seats containing figures of St. John the Evangelist and the Bishops of the Seven Churches. In a circle above all will be the Four-and-twenty Elders. The groups of figures on the ribs will illustrate the chorus of praise to the Lamb.

The circular panels and medallions will contain the Visions of the Apocalypse. In the segment which was exhibited the upper panel represented the Vision of Christ in Judgment, and the lower panel (shown in the illustration) the Rising of the Dead from the Sea. The subjects of the two are taken from the eleventh, twelfth, and thirteenth verses of the twentieth chapter of the Revelation:—

> And I saw a great white throne, and Him that sat on it, from whose face the earth and the heaven fled away; and there was found no place for them. And I saw the dead, small and great, stand before God; and the books were opened: and another book was opened, which is the book of life: and the dead were judged out of those things which were written in the books, according to their works. And the sea gave up the dead which were in it.

MOUNT MORRIS BANK-BUILDING, NEW YORK, N. Y. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

THIS design was the one selected in a competition for the above building in New York. The plan contemplates a fire-proof building containing the bank, deposit-vaults, storage-vaults, and four floors of apartment-flats. The bank is entered both from One Hundred and Twenty-fifth Street, and also Fourth Avenue, under an arched vestibule with stone ceilings. It contains beside the banking-room, the president's room, which connects with the deposit-vaults below by private staircase, large directors' room, double toilet-rooms, and two-storied safe. The finish is mahogany throughout. In the centre of the One Hundred and Twenty-fifth Street façade is the entrance to the deposit-vaults, which is four steps below the sidewalk, and entered under a massive archway with vestibule in red sandstone. The vault is 14′ x 21′ inside, with heavy walls of brick and chilled steel, and has a clear passage around it lined with white glazed brick. The floor in this passage is iron-grated, so as to allow free view to the storage vaults below. The examination-rooms are numerous and one contains a platform-lift to allow bulky matters to be examined and then lowered to the storage-vaults. There are also an office, waiting-room, toilet-room, and all finished in ash. To the left of the deposit entrance is the entrance to the apartments, also through an arched vestibule. The elevator is near at hand and goes from the cellar to the roof. The apartments are entirely cut off from the banking part of the building, and occupy four floors, giving six full suites. The materials used are Philadelphia brick, red sandstone and terra-cotta.

HOUSE FOR JOHN FARR, ESQ., SHORT HILLS, N. J. MR. JAMES BROWN LORD, ARCHITECT, NEW YORK, N. Y.

THIS house will be built of gray stone with Philadelphia pressed-brick quoins to all window and door openings and angles of building, up to second story. Superstructure, frame and shingle.

THE BROAD-STREET PASSENGER STATION OF THE PENNSYLVANIA RAILROAD COMPANY AT PHILADELPHIA.

[From the *Building News.*]

WE present to our readers this week a perspective view of the new Broad-Street Station at Philadelphia, which has recently been opened for use by the Pennsylvania Railroad Company. The clock-tower at the northeast corner of the building gives emphasis and breaks the sky-line agreeably, besides being in itself a fine piece of design. The clock-dial will be seven feet in diameter, and the height from the pavement 120 feet — the total height of the tower, exclusive of iron-work and finial at the top, being 170 feet. The designs, details, and specifications were furnished by Messrs. Wilson Brothers and Co., civil engineers and architects, their Mr. Joseph M. Wilson being the well-known engineer of bridges and buildings to the Company. The execution of the work has been superintended by chief-engineer W. H. Brown and his corps of assistants.

HOTEL COMMUNAL D'ANDERLECHT. M. VAN YSENDYCK, ARCHITECT.

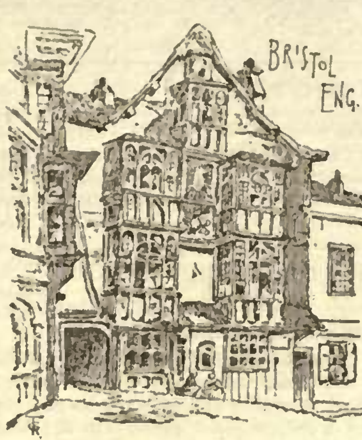
[From *Le Moniteur des Architectes.*]

HOTEL, RUE DUMONT D'URVILLE, PARIS, FRANCE. M. TRONQUOIS, ARCHITECT.

[From *La Semaine des Constructeurs.*]

HISTORICAL "MONUMENTS" IN FRANCE. — The Commission of Historical Monuments at its last sitting classified the following edifices as worthy of national preservation: The Château de Kézouzéré (Finistère), built at the commencement of the fifteenth century, and that of Mortier-Crolle (Mayenne), constructed towards the end of same century; a house in the Queen Anne style of architecture at Morlaix (Finistère), containing a very curious staircase; the Tower of Hautefage (Lot-et-Garonne; the great Cross in the Couchey burial-ground (Côte-d'Or), which dates from the sixteenth century; the Oratory of Bellecroix at Villeneuve-les-Avignon (Gard), which, although in a state of ruin, is especially interesting for its plan and disposition; the façade of the central pavilion and of the tower of the Château de la Tour-d'Avigues (Vaucluse); the Church of St.-Vaast de Longmont (Oise), the steeple of which, erected in the twelfth century, is very remarkable; and the Church of St.-Aignan (Loir-et-Cher), which, in spite of the mutilations it has undergone, still presents much interest, and possesses a very fine crypt. — *The Architect.*

ROYAL PALACES.



THE demolition of the Tuileries, says the London *Globe*, which will soon be an accomplished fact, and the narrow escape of Hampton Court from destruction, warn the builders of sumptuous palaces of the fate which so often awaits their architectural triumphs long before the ravages of time or the assaults of a military enemy have done the work of destruction. This age is not one for private palaces, whether the occupant thereof be a king or emperor, an owner of broad acres or a successful speculator. The survivals of Kensington House and Hampton Court are no doubt exceptional; but there are in many places throughout the country other palatial residences which have been degraded from the use destined for them by their founder, and employed as hospitals, asylums, or public institutions of some sort or other. The royal palaces of France and several other countries have shared a similar fate, and their humbled fortunes compare rather strikingly with the growth on all sides of such buildings as Palaces of Justice, Crystal Palaces, and other gigantic structures designed for practical use or public entertainment.

None, however, of these edifices, at least in Christian countries, can be compared for a moment, in point of extent, to the dwelling-places of the great monarchs of the Old World. We must go back to a period before the beginning of modern history for an account of a royal palace on what may be called really a large scale. The palace of Babylon, for instance, measured three hundred stadia, or about four miles in circumference, and its architecture was worthy of the town whose walls at the top were of the width of a good turnpike road. The nearest approach to this spacious magnificence in modern times is, perhaps, the famous Summer Palace near Pekin, the pillage of which in 1860 provided so many houses in England and France with an assortment of valuable curiosities. But the flimsy masonry and wood-work of the Celestial authorities could no more be compared in splendor with the massive walls and pillars of the Assyrian builders than a doll's house with a Norman castle. The first great palace in Europe was that which has given its name to all subsequent buildings of the sort — the grand pile of buildings appropriated by Augustus Cæsar to his own use on the formation of the empire. Before his death the whole extent of the Palatine Hill was included in the circuit of the imperial residence, and that architectural talent which "found Rome built of brick and left it built of marble" did not expend its least energetic care upon the halls and porticoes of the Palatium. Yet this ample space of the most valuable building ground ever known did not suffice for the succeeding emperors, who encroached far into the city, and had usurped hundreds of private houses by the time that Nero's "golden palace" rose to scandalize the few remaining believers in the great "republic" of Rome. A reaction set in which may be in some sort compared to that which has been going on in modern Europe for the last two or three centuries, and from that time forward the extravagance of the emperors exhibited itself rather in providing luxurious buildings for the populace, such as baths, theatres, and hippodromes, than in the further extension of the overgrown edifices of the Palatine.

A more selfish and silly impulse prevailed with the degenerate emperors of the East, who did much more for the embellishment of their palace on the Bosphorus than for the public edifices. Between the Cathedral of St. Sophia, now the greatest mosque in existence, and the hippodrome, arose under the direction of Constantine an imitation of the Augustan palace at Rome. But the gradual additions of succeeding sovereigns, while it enriched the interior, gave to the outward building an irregular and clumsy appearance, which almost every emperor aggravated by destroying a part of the existing structure, to replace it with some whim of his own. Theophilus had the good or bad taste and the boldness to imitate a design of the palace at Bagdad, and he introduced thence the use of domes now so common in the whole of the East. It was he who added to the ornaments of the palace the two celebrated gold lions and the golden tree with artificial singing birds in it, and who raised terraces of marble on the top of which his throne of jewelled gold was set. His ministers were ranged on steps a little lower down, and next to them the populace, while at the lowest part were exhibited pantomimes and comic plays. The Bagdad palace itself was chiefly famous for its splendid tapestry, of which thirty-eight thousand pieces were hung on its walls. There were also twenty-two thousand carpets of the most costly workmanship, and on these the one hundred tame lions were laid in obedient silence by their black attendants. At Cordova the splendor of the Saracen Caliphs was not less amply displayed, and the palace of Zehra absorbed in its first construction £3,000,000 sterling, and took twenty-five years to build. It is probable that some, at least, of all the decorations in which the Caliphs

delighted were only borrowed from the patterns found by the Arabs in Persia, when the venerable dynasty of the Sassanides was overwhelmed by the Mohammedan arms.

FIRE-PROOF PAINT.

To the Editors of the American Architect: —

Dear Sirs, — Will some one (besides the patentees) give some rational statements about so-called "fire-proof paint." What its fire-resisting qualities (if any) depend upon, and what experiments have been made? Phœnix.

A QUESTION OF FEE.

Detroit, Mich., April 23, 1883.

To the Editors of the American Architect: —

Sirs, — I have made a set of general plans and specifications for a house, which were accepted by the owner, who finally decided not to build from these plans, but to build a smaller and cheaper house. Is it customary to make a reduction from the usual prices for the first set of plans, etc.? Yours truly, Justice.

[We see no reason why the usual charge for general drawings and specifications should not be made. — Eds. American Architect.]

NOTES AND CLIPPINGS.

Chilian Explorations. — The Chilians have at present several thousand men advancing from different directions into the Araucanian territory. Up to now they have met with slight opposition, although past events have led the Government to anticipate that stubborn opposition would be encountered. Among a number of letters from correspondents accompanying the different expeditions is one descriptive of the newly-discovered site of the city of Villarica, a populous and opulent city, which, after a siege of two years and eleven months, fell into the hands of the Araucanians in 1692. The writer states that he has walked among the ruins, now thickly studded with well-grown oaks, and among them has traced streets which were fully one mile in length, and which had been divided into blocks of 100 yards square, as was customary in most of the cities founded by the Spaniards. The city had been surrounded by a wall, which is yet in a fair state of preservation from three to six feet from the ground — a sufficient defense in former days against any ordinary Indian attack. Tiles were found which have hardened to the consistency of stone, and which are in better condition than when they were the mute witnesses of the destruction of this inland city so many years ago. In the vicinity there is a very extensive lake, in which an island is situated which is reported to be swarming with the descendants of the domestic animals belonging to the Spaniards who were here sacrificed by the victorious Araucanians. The description given is brief in the extreme, but it will soon be supplemented by fuller and yet more interesting reports of this and other cities which were destroyed at the same time. All the districts now being explored — and notably that surrounding Villarica — abound in mines, which returned large sums during the Spanish occupancy. These mines will again be worked under different auspices, and will lend their assistance in promoting the rapid settlement and development of Araucania, so long occupied by the scattered bands claiming dominion over it, but which now promises to become one of the richest provinces of Chili. — *Panama Star and Herald.*

Whitewood. — In a recent note, writing of American or canary-colored whitewood, we expressed the opinion that many of the good qualities this wood possesses are not appreciated in this country as they deserve. For wide panels, in cabinet and coach work, it has been used here for some time past, and for the purpose it has been found in every way suitable, being a soft yellow wood, easily worked, and not given to warping. In the United States this wood is extensively used for a variety of purposes for which we are accustomed to use pine or other harder woods. From a recent issue of the *Lumber World*, we learn that a large sash and door factory in Ohio has more than doubled its capacity during the past year, the specialty of this firm being whitewood, which they are rapidly introducing in the Eastern States as a substitute for pine in such things as doors, mouldings, and every form of dimension stuff, such as used by organ builders, furniture manufacturers, etc. — *Timber Trades Journal.*

Enlargement of Birmingham Station. — Operations have commenced by which at a cost of $1,250,000 New Street Station, Birmingham, England, will be converted into the largest railway depot in the world. It will cover a total area of 45,000 square yards, or over eleven acres, and will have three platforms each 1,000 feet long.

A Model's Suit. — A stalwart 'longshoreman named Burns claimed $80 damages from J. Q. A. Ward, the New York sculptor, recently, for non-fulfilment of contract. Ward wanted a giant as a model for a statue of Washington, and the 'longshoreman was selected at $15 a week, and he was to have four or five months' work. He complained that it hurt his legs to stand in one position so long. He was of no use, and at the end of the week Mr. Ward let him go. The decision was in Mr. Ward's favor.

The Old Palais de Justice, Brussels. — It has been decided to pull down the old Palais de Justice at Brussels, and on its ruins erect a building in which the archives of the kingdom will be kept. It will be called the "Palais des Archives," and is to be six stories in height, and will contain 420 fire-proof chambers. It is to be completely isolated from all other buildings. Advantage will be taken of the demolition of the old buildings to construct two new streets. The cost is estimated at 2,000,000 francs.

Discovery of a Roman Mosaic at Carthage. — Captain Prudhomme, of the Eighty-third Regiment of the French army, stationed near Tunis, has discovered, buried in the sand on the beach of the Gulf of Carthage, a splendid piece of mosaic-work, measuring about 140 feet, and so well preserved that the designs are easily traceable. It bears three inscriptions in Roman capitals, and on each side a seven-branched candlestick. The designs include figures of birds, lions, and fishes, ornamental scrolls, etc. The general sense of the inscriptions appears to chronicle the construction of a synagogue erected by the Jews resident in the country under the domination of the Romans. Père Delattre, the well-known archæologist of Tunis, the modern Carthage, is now examining this remarkable mosaic, and will doubtless arrive at the exact meaning of the three inscriptions. The outer walls of the building, of which it must have formed part, are entirely destroyed, nothing remaining but the foundations and the pavement, which are buried some three or four feet in the earth. It was erected near the shore, and the sea, which has been gaining ground on this part of the coast, now comes up to within a few feet of the remains. — *The Architect.*

Apparatus for Disinfection. — In several hospitals in Berlin, Stettin, and other parts of Germany, the disinfecting apparatus of Schimmel & Co, of Chemnitz, patented about a year ago, is now used. The agent is heat (both moist and dry). The general arrangement is as follows: There is a large case with double walls of sheet-metal and a bad heat conductor between. This communicates with a chimney at the top behind, and in front has two doors; the upper doorway admits a frame-bearing wagon on rails, and the lower another wagon, also on rails, with the heating system. The former wagon has a permeable bottom and cross-bars in the frame, from which are hung in linen bags the clothes to be disinfected. The lower wagon carries a thick tube which returns (horizontally) on itself, and bears a series of projecting ribs. Above and parallel with it is another tube of copper, with numerous small holes to let steam out. When the laden clothes-wagon has been pushed into the upper part and the door shut behind it, the steam valve of the connection with the rib tube system is opened, as also an air-valve below and the chimney-valve, and the heating proceeds till a thermometer, readable outside, marks 110° C. Then the steam and chimney valves are two-thirds closed, and the other steam-valve, that of the perforated tube, opened. The steam is thus allowed to act directly about twenty to thirty minutes. After this tube is closed further heating by the other system is continued about a quarter of an hour, the ventilating valves being fully open. The process of disinfection lasts one and one-quarter to one and one-half hours. The upper wagon may then be taken out and laden afresh. — *London Times.*

Quarter-sawed Yellow-Pine. — There is no lumber that will shrink so little and wear so long as quarter-sawed. This process of sawing is particularly applicable to yellow-pine flooring, as such flooring is generally laid where it is subjected to heavy wear. A bastard-sawed board, no matter from what kind of timber it is cut, will wear rough, and sliver, if in constant use for flooring or driveways. It would be impossible to conceive of a harder, more durable floor than yellow-pine would make if it were quartered. The pitch it contains would give it an advantage over oak, ash or maple in point of durability. A few of the Southern mill-men are beginning to understand the merits of such flooring, and are selecting the few quartered boards that every log sawed the old-fashioned way invariably has, and putting them in a grade by themselves. It is a bad way of doing, for the balance of the flooring is depreciated in value, and in fact sometimes almost worthless, for no man who is acquainted with its defects would think of making a floor of it. It might answer for a floor that is to be kept carpeted, but usually such a floor is made of softer and cheaper wood. The expense of quarter-sawing would be considerably in excess of the usual way of manufacture, but the flooring would be richly worth the difference. Quartered oak in the large markets is worth on an average, $10 per thousand more than clear oak sawed bastard, and there ought to be nearly that difference between the two kinds of yellow-pine flooring. A log, if quarter-sawed, does not yield as much lumber as if sawed the other way, and sawing it that way is a slower job. Quartered flooring ought to be one of the productions of the Southern mills. Builders should not object paying a third more for it, when they know its beauty and durability are more than doubled as compared with bastard, and every intelligent builder ought to know that such is the fact. — *Northwestern Lumberman.*

Cripplegate. — Cripplegate was a postern gate leading to the Barbican, while this watch-tower in advance of the city walls was fortified. The road between the postern and the burgkenning ran necessarily between two low walls, most likely of earth, which formed what in fortification would be described a covered way: the name in Anglo-Saxon would be *crepel*, or *crypele*, a passage under ground, and *geat*, a gate, street, or way. So says Mr. Denton, and it seems rightly, and cites another Crypelgeat in Wiltshire. Of course, against this view must be taken the fact that the parish church, built about 1100, was dedicated to St. Giles, the patron saint of all cripples, which is a singular coincidence if it be one only. Nothing of the old church remains unless it be the base of its tower, the present church having been built about the end of the fourteenth century, though gutted by fire in 1545. Within its walls lie Frobisher, Foxe, Glover, the herald, Speed, and, greatest of all, Milton; while Bunyan and De Foe are buried within the parish, in what was once known as Tyndale's Burial-ground and now as Bunhill Fields. Here Oliver Cromwell was married in 1620, and here, four years later, was baptized under the false name of Robert Wright, an illegitimate grandchild of Coke, whose wife's scheming was thus rewarded. The belfrey boasts twelve bells, the largest number in any city church, a peal which perhaps owes its completeness to a noble parishioner — the first Earl of Bridgewater, who "was an indefatigable ringer." — *The Athenæum.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents heremementioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

275,799. WINDOW-REFRIGERATOR. — Eugene H. Benoist, St. Louis, Mo.

275,802. SEWER-INLET. — Edward Z. Collings, Camden, N. J., and Charles F. Pike, Philadelphia, Pa.

275,803. SEWER-FLUSHING DEVICE. — Edward Z. Collings, Camden, N. J., and Charles F. Pike, Philadelphia, Pa.

275,815. SCREW-TAP. — Cicero R. C. French, Providence, R. I.

275,816. FIRE-ESCAPE. — David Friedheim, New York, N. Y.

275,832. DOOR BRACE OR STAY. — Philo J. Lockwood, Auburn, Ind.

275,837. BATH-ROOM. — Jas. C. McLaughlin, Cincinnati, O.

275,838. WATER-CLOSET. — Jas. C. McLaughlin, Cincinnati, O.

275,841. APPARATUS FOR MAKING ROOFING FABRIC. — Henry M. Miner, Pittsburgh, Pa.

275,852. SLIDING CAR-DOOR HANGER. — Edwin Prescott, Arlington, Mass.

275,857. HYDRAULIC OR OTHER ELEVATOR. — Gustavus N. Reiff, Philadelphia, Pa.

275,860. BIT-BRACE FASTENER. — Elmore E. Rose, Springfield, Mass.

275,895. FIRE-ESCAPE. — Haskett D. Eastmann, Minneapolis, Minn.

275,900. BOWL FOR WATER-CLOSETS. — Joseph J. B. Frey, New York, N. Y.

275,903. SASH-HOLDER. — Frederick H. Gross, Deer Isle, Me.

275,905. FIRE-ESCAPE LADDER. — Lucius Hamlin, Sebago Lake, Me.

275,911. FILE-HANDLE. — Geo. W. Hill, Stark's Point, Wash.

275,933. FIREPLACE. — Gardner L. Morrison, Brooklyn, N. Y.

275,950. ELEVATOR. — Bradshaw Sewall, Farmington, Me.

275,962. FIRE-ESCAPE. — William Ulrich, Rock Falls, Ill.

275,978. STRAINER FOR WATER-FAUCETS. — Geo. F. Barrington, San Francisco, Cal.

276,000. SPRING-HINGE. — John K. Clark, Buffalo, N. Y.

276,050. FASTENER FOR THE MEETING-RAILS OF SASHES. — Hiram T. King, Rochester, N. Y.

276,057. FIRE-ESCAPE. — Daniel Luscher, Cincinnati, O.

276,076. ELEVATOR. — Wm. H. Ridgway, Coatesville, Pa.

276,081. PERMUTATION-LOCK. — Rufus Sarlls and Virgil C. Holland, Gainesville, Tex.

276,082. WINDOW-GUARD. — Bertha Schmitt, Brooklyn, N. Y.

276,085. METALLIC ROOFING. — Emil Severin, Aurora, Ind.

276,090. FIRE-ESCAPE. — Alfred W. Sperry, Hartford, Conn.

276,102. CHIMNEY-CAP. — James H. Watt, Barnesville, O.

276,106. DISINFECTING WATER-CLOSETS. — Horace E. Wells, Cleveland, O.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report thirty-four permits have been granted, the more important of which are the following: —

Holland & McDonnell, 29 two-st'y brick buildings, n w cor. Chester and Chew Sts.

C. C. Josenhar, three-st'y brick building, s s Pratt St., between Goldsmith Alley and Pason St.

W. T. Markland & Bro., 2 three-st'y brick buildings, n w cor. Lexington and Pine Sts.; and 5 three-st'y brick buildings, w s Pine St., n of Lexington St.

S. T. Richardson, 7 three-st'y brick buildings, e s Fulton Ave., n e cor. Patterson Ave.; 5 three-st'y brick buildings, n s Patterson Ave., e of Fulton Ave.; 2 two-st'y brick buildings, n s Bruce Alley, in rear of above; 15 three-st'y brick buildings, s s Lafayette Ave., e e cor. Calhoun St.; 2 three-st'y brick buildings, e s Calhoun St., s of Lafayette Ave.; and 4 two-st'y brick buildings on 20 feet court.

Arabella Russell, three-st'y brick building, w s Park Ave., n of Wilson St.

John G. Dressel, two-st'y brick building, n w cor. Canton and Collington Aves.

Jos. M. Cone, 15 three-st'y brick buildings, n s Harlem Ave., e of Arlington Ave.

A. Lutz, three-st'y brick building, e s Stockton St., between Pressman St. and Patterson Ave.

Richard Hartmaier, two-st'y brick building, n e Hoffman St., between Pennsylvania Ave. and Division St.

E. E. Shipley, three-st'y brick building, n e cor. Bolton and Division Sts.

Geo. Russell, three-st'y brick building, and two-st'y brick stable in its rear; E. S. Patterson, Park Ave., s of Orleans St.

Geo. A. Hartman, 2 three-st'y brick buildings, e s Caroline St., n of Chase St.

Henry Shumburg, 2 three-st'y brick buildings, w s Paca St., between Sterrett and Hamburg Sts.

Boston.

HOSPITAL. — An addition is to be made to the Massachusetts Homœpathic hospital building, Messrs Allen & Kenway, architects.

BUILDING PERMITS. — *Brick.* — *South St., No.* 198, Ward 12, for Patrick Holley, dwell. and store, 20' x 34', four-st'y flat; Angus McInnes, builder.

Marlborough St., No. 246, Ward 11, for Horatio Whitwell, dwell., 25' x 55', three-st'y mansard; Joseph McKeening, builder.

Wood. — *Rossiter St.*, near Union Ave., Ward 24, for Hazard Stevens, dwell., 25' x 30' 6", two-st'y pitch; Samuel T. Waters, builder.

Savin Hill Ave., near Grampian Way, Ward 24, for Geo. C. Scott, dwell., 32' x 32', and 12' 6" x 16', two-st'y pitch; D. A. Berry, builder.

Waverly St., near Blue Hill Ave., Ward 21, for Albert J. Foster, dwell., 20' and 29' x 44' and 14' x 16', two-st'y pitch.

Sarin St., No. 20, Ward 21, for W. A. Duncanson, dwell., 22' and 27' x 31', and 16' x 22', two-st'y pitch; W. A. Duncanson, builder.

Rockland St., near Dale St., Ward 21, for Frank Maynes, 2 dwells., 20' x 30', two-st'y hip; Andrew Anderson, builder.

Lexington St., Nos. 240-242, Ward 1, for Henry Ewell, 2 dwells., 20' 6" x 45', two-st'y mansard; Geo. W. Hargrave, builder.

North Beacon St., nearly opposite Lyman Ave., Ward 25, for Henry B. Goodenough & Co., storage, 27' x 38', two-st'y flat; Jacob W. Berry, builder.

Champney St., cor. Unnamed St., Ward 14, for William Rafferty, stable and cooper-shop, 22' x 30', two-st'y flat; Wm. Rafferty, builder.

Beach St., near Washington St., Ward 23, for Conrad Etter, dwell., 22' x 30' and 7' x 16', two-st'y pitch.

Trenton St., No. 165, Ward 1, for S. D. Wallace, dwell., 16' and 23' x 54', two-st'y mansard; Frame & Patten, builders.

Ashley Ave., near Elm St., Ward 1, for John S. Gurshinsky, dwell., 20' x 30', one-st'y pitch; Angus D. McDonald, builder.

East Broadway, Nos. 727-731, Ward 4, for Otis D. Dana, 2 dwells and stores, 23' x 56' and 3' x 33' each, three-st'y flat; Horace Manson, builder.

Marion St., Nos. 50 and 52, Ward 1, for Coleman Cook, 2 dwells., 12' 6" x 34', two-st'y mansard; Coleman Cook, builder.

Summer St., near Cottage St., Ward 24, for Frank O. Nash, 2 dwells., 31' 6" x 34' 9"; 2 dwells., 22' x 32' and 14' x 18'; 2 dwells., 31' 9" x 40'; Wm. A. Blazo, builder; two-st'y hip.

Brooklyn.

BUILDING PERMITS. — *Elm St.*, n s, 174' 3" w Bushwick Ave., 3 two-st'y frame tenements, tin roofs; cost, each, $2,000; owner and builder, John Mitchell, 184 Devoe St.; architect, Wm. Clemett.

George St., n s, 100' e Central Ave., three-st'y frame factory, gravel roof; cost, $3,500; owner, John G. Jenkins, 771 Broadway; architect, E. F. Gaylor; builders, Jenkins & Gillies.

Troutman St., s s, 125' e Evergreen Ave., three-st'y frame double tenement, tin roof; cost, $4,000; owner, Martin Schell, 20 Graham Ave.; architect, John Platte; builders, Wm. Rauth and P. Scher.

Hancock St., s s, 470' e Bedford Ave., 5 three-st'y brownstone front dwells., tin roofs; cost, each, about $9,000; owner, architect and builder, T. B. Jackson, 424 Clinton Ave.

Bushwick Ave., e s, about 50' n Hull St., two-st'y frame stable, tin roof; cost, $1,250; owner, Joseph Payzer, Bushwick Ave.; builder, N. McCormack.

Fourth St., s s, 147' 10" w Sixth Ave., 9 two-st'y brownstone front dwells., gravel roofs; cost, each, $5,000; owner, Patrick Mullady, 576 Quincy St.; architects, Parfitt Bros.; carpenter, P. Ward.

De Kalb Ave., n w cor. Washington Ave., three-st'y brownstone front dwell., tin roof; cost, $10,000; owner and builder, D. H. Fowler, 14 Verona Pl.; architect, A. Hill.

Bergen St., No. 835, n s, 150' w Classon Ave., three-st'y frame tenement, tin roof; cost, $4,000; owner, Edward J. Murphy, Pacific St.; architect, W. A. Mundell; built by days' work.

Manhattan Ave., w s, 25' s Java St., three-st'y frame store and tenement, gravel roof; cost, $4,000; owner, —— Costimer, Manhattan Ave.; architects and builders, Randall & Miller.

North Second St., s s, 100' 3" w Fifth St., one-st'y brick shop; cost, $9,000; owner, F. Haberman, 294 Pearl St., New York; architects, Thom & Wilson; builder, Jno. McQuaid.

Grand St., s w cor. Fifth St., four-st'y brick warehouse and store, tin roof; cost, $20,000; owner, —— Constable, Greene Ave.; architect, A. Herbert.

Myrtle Ave., n s, 40' e Portland Ave., 2 four-st'y brick stores and flats, tin roofs; cost, each, $13,000; owner and builder, Jno. Gordon, on premises; architect, Robt. Dixon.

Third Ave., s w cor. Fifty-fourth St., three-st'y frame store and dwell., tin roof; cost, $3,700; owner, Lawrence McKnight, Third Ave., cor. Nineteenth St.

Park Ave., n s, 325' e Marcy Ave., three-st'y frame store and tenement, tin roof; cost, $3,500; owner, architect and builder, Henry Loeffler, 189a Stockton St.

ALTERATIONS. — *Van Dyke St., No.* 102, one-st'y frame extension, tin roof; cost, $200; owner, Henry Nuntz; builder, E. M. Detleffson.

Chicago.

CHURCH. — Grace Reformed Episcopal Church, 30' x 50', English style, pressed-brick and terra-cotta, gables of concrete work, slate roof; cost, $3,500; H. J. Starbuck, architect.

BANK-BUILDING. — Messrs. Jaffray & Scott are architects for the six-st'y bank-building to be built by the Commercial Safety Deposit Company, cor. Monroe and Dearborn Sts. The dimensions are 90' on Monroe, by 130'. The material is St. Louis pressed-brick and terra-cotta finish. In the basement will be located the vaults and offices of the Commercial Safety Deposit Co. The first floor will be occupied by the Commercial National Bank of Chicago, and the other floors will be devoted to offices, — over one hundred in number. The structure will cost $250,000.

WAREHOUSE. — Jaffray & Scott are architects of the Champion Reaper Co.'s warehouse, cor. Adams and Jefferson Sts., in the West Division. The dimensions are 80' x 200', five stories high; the cost will be from $90,000 to $100,000.

BUILDING PERMITS. — R. H. Moulton, two-st'y brick dwell., 25' x 70', Monroe St., near Leavitt St.; cost, $5,000.

N. G. Johnson, three-st'y basement brick flats, 22' x 45', 120 Sedgwick St.; cost, $4,000.

H. H. Gage, three-st'y brick flats, 44' x 44'; cost, $7,000.

Jno. Reick, two-st'y basement brick flats, 20' x 60', 650 Dixon St.; cost, $4,000.

Pullman Palace Car Co., nine-st'y basement brick offices and flats, 120' x 170', s w cor. of Michigan and Adams Sts.; cost, $500,000.

J. M. Griest, two-st'y brick dwell., 30' x 50', 3863-3867 Lake St.; cost, $10,000.

U. Seyfried, 2 two-st'y basement brick flats, 43' x 52', 516-518 Fourteenth St.; cost, $6,000.

Frank Sinski, two-st'y basement brick flats, 24' x 60', 690 Van Horn St.; cost, $4,000.

Peter Thompson, two-st'y basement brick flats, 31' x 55', 38 Evergreen Ave.; cost, $4,000.

John Rider, two-st'y brick store and dwell., 24' x 60', 3429 Auburn St.; cost, $3,000.

HOUSES. — House for Wm. Troost, Esq., Dearborn Ave., cor. Division St., 35' x 70'; cost, $12,000; J. N. Tilton, architect.

Two houses for E. D. Hosmer, Esq., Groveland Ave., near Thirty-second St., each 20' x 60'; cost, each, $5,000; J. N. Tilton, architect.

Two houses for R. Orelup, Esq., Groveland Ave., near Thirty-second St., each, 20' x 60'; cost, each, $5,000; J. N. Tilton, architect.

Cincinnati.

BUILDING PERMITS. — Miss Belle McIntyre, two-st'y frame dwell., Park Ave., near Vine St.; cost, $5,000.

August Miller, three-st'y brick dwell., State Ave., near Gest St.; cost, $9,000.

A. McKaid, three-st'y brick dwell., Third Ave., between James and Rachael Sts.; cost, $1,000.

John Hater, three-st'y brick building, Betts St., between Central Ave. and John St.; cost, $6,000.

Wm. Buck, four-st'y stone front building, s w cor. McLean and Harrison Aves.; cost, $12,500.

Mark Levi, alteration to four-st'y brick store, s e cor. Pearl and Walnut Sts.; cost, $7,000; Chas. Crapsey, architect.

J. H. Empson, 10 two-st'y brick dwells., Linn St., near Wade St.; cost, $15,000; Wm. Wicker, builder.

Mosler & Co., four-st'y brick factory, n e cor. Bank and Denman Sts.; cost, $11,000.

D. Fix, three-st'y brick building, Harrison Ave.; cost, $3,000.

A. C. Richards, three-st'y brick dwell., Kemper Lane, near Windsor St.; cost, $11,000.

Geo. Stribley, four-st'y brick building, Fourth St., between Main and Sycamore Sts.; cost, $3,000.

Strobridge & Co., five-st'y brick printing-house, on Canal St., near Race St.; cost, $40,000; Samuel Hannaford, architect.

J. J. Abbihl, two-st'y brick building, s w cor. Vine and St. Clair Sts.; cost, $3,000.

Henry Jenny, two-st'y brick building, Vine St., between St. Clair and Wayne Sts.; cost, $3,000.

A. Lowhouse, three st'y brick building, Poplar St., near Dalton Ave.; cost, $4,000.

Clement Oskamp, four-st'y stone front store, Central Ave., between Eighth and Ninth Sts.; Henry Bevis, architect; cost, $15,000.

A. Brust, three-st'y brick building, Oak St., near Buckeye St.; cost, $3,500.

Mrs. Bice, three st'y brick dwell., David St., near Central Ave.; cost, $4,000.

Mrs. B. Hart, two-st'y frame dwell., Hawthorne Ave., near Warsaw Pike; cost, $4,500.

H. Herning, two-st'y brick building, Calhoun St.; cost, $4,000.

A. Smith, two-st'y brick building, Wheeler St.; cost, $3,000.

Miss Kate Riley, three-st'y dwell., No. 129 Longworth St.; cost, $5,000.

Twenty-six permits for repairs; cost, $26,000.

Total permits to date, 270.

Total cost to date, $1,056,100.

Detroit.

BUILDING PERMITS. — Jas. Anderson, brick dwell., No. 23 Spruce St.; cost, $4,900.

A. Beaton, 3 frame dwells., Fourth Ave.; cost, $9,000.

Nuppenan & Clark, brick school-house, cor. Cass Ave. and Stimson St.; cost, $30,000; G. W. Lloyd, architect.

A. Beaton, frame dwell., No. 585 Third St.; cost, $3,500.

H. George & Son, frame dwell., No. 17 Prentis Ave.; cost, $3,000.

G. W. Buffum & Co., 2 brick dwells., Charlotte Ave., Nos. 181 and 183; cost, $6,000.

M. W. Scoville, 2 frame dwells., Fourth Ave.; cost, $4,000.

Julius Hess, brick dwell., No. 46 Canfield Ave.; cost, $8,000.

Richard Nelson, brick shop, Plum St.; cost, $4,000.

A. C. Varney, brick dwell., Second St.; cost, $5,000.

Julius Hess, additions to brick brewery, Grand River Ave.; cost, $10,000.

Robert Bird, 3 frame dwells., Seventh St.; cost, $10,500.

J. F. Weber, frame dwells., Sixth St.; cost, $12,000.

New York.

APARTMENT-HOUSES. — Four apartment-houses, 25' x 54' each, five stories high, are to be built for Mr. Frank Seitz, on the cor. of Second Ave. and Seven-

ty-fifth St. The fronts on Second Ave. are to be brownstone; on Seventy-fifth St., Philadelphia face-brick, with brownstone finish; cost, about $25,000. Mr. Jos. M. Dunn is the architect.

Bank. — The competition for the Dime Savings Bank, of Brooklyn, has resulted in the appointment of Mr. J. R. Thomas, of this city, as architect.

Church. — Abraham A. Andruss, President of the Board of Trustees of the Church of the Disciples of Christ, has filed plans for a new church-building to be erected on the north side of Fifty-sixth St., 275′ w of Eighth Ave.; estimated cost, $55,000.

Tenements. — A five-st'y brick tenement-house, the first st'y to be used for stores, is to be built at Nos. 3, 5 and 7 Roosevelt St., for Mr. W. D. Fulke, from designs of Messrs. D & J. Jardine.

Office-Building. — The building for Mr. Orlando B. Potter, on Park Row, is now to be proceeded with, from designs of Messrs. Starkweather & Gibbs.

Building Permits. — *One Hundred and Forty-third St.*, s s, 100′ w Third Ave., five-st'y brick tenement, tin roof; cost, $12,000; owner, Geo. B. Whitfield, 111 East Seventeenth St.; architect, John Rogers.

Elm St., Nos. 143 *and* 145, seven-st'y brick factory, tin roof; cost, $35,000; owner, Van Zandt Estate, Wm. T. Van Zandt, exr., 52 University Pl.; architect, John McIntyre.

Tenth Ave., w s, 30′ n One Hundred and Sixty-fifth St., three-st'y frame dwell. and store, tin roof; cost, $4,000; owner, Mary Clancy, Tenth Ave., near One Hundred and Sixty-fifth St.

One Hundred and Twenty-sixth St., n s, 88′ w Fifth Ave., two-st'y brick stable, slate and tin roof; cost, $7,000; owner, Lucien C. Warner, 2025 Fifth Ave.; architect, A. B. Jennings.

Fifty-sixth St., n s, 275′ w Eighth Ave., two-st'y brick and stone church, slate and tin roof; cost, $55,000; owners, Trustees of the Church of the Disciples of Christ, A. A. Andrews, pastor, 415 West Forty-third St.; architect, Chas. Mettam; builders, A. A. Andrews & Son and Christie & Dykes.

Eighty-ninth St., s s, 210′ e Third Ave., 4 five-st'y brick tenements, tin roofs; cost, each, $17,000; owner, Philip Braender, Ave. B, cor. Eighty-fifth St.; architect, John Brandt.

East Eighty-first St., Nos. 226 *and* 228, five-st'y brick tenement, tin roof; cost, $40,000; owner and architect, same as last.

Water St., n s, 146′ w Pike Slip, one-st'y brick boiler-house, tin roof; cost, $10,000; owner, Geo. V. Hecker, cor. Rutgers and Cherry Sts.; architects, Wm. Field & Son.

One Hundred and Twenty-eighth St., s s, 225′ w Seventh Ave., 3 four-st'y brick and stone flats, tin roofs; cost, each, $25,000; owner, H. Muhlker, 129 West One Hundred and Fourteenth St.; architect, Wm. H. Hume; builder, not selected.

Elton Ave., w s, 75′ n One Hundred and Fifty-fifth St., three-st'y frame tenement; cost, $4,000; owner, Wm. Birss, 720 Elton Ave.; builder, not selected.

West One Hundred and Thirty-first St., No. 33, 2 three-st'y and basement brownstone front dwells., tin roofs; cost, each, $9,000; owner, Walter S. Price, 1743 Lexington Ave.; architects, Cleverdon & Putzel.

One Hundred and Twenty-sixth St., s s, 95′ w Sixth Ave., 4 three and four st'y brownstone front dwells., tin roofs; cost, each, $17,000; owner, Chas. Batchelor, 177 West One Hundred and Twenty-sixth St.; architect, M. V. B. Ferdon.

First Ave., w s, from Forty-eighth to Forty-ninth St., 8 five-st'y brick tenements and stores, tin roofs; cost, each, $12,000; owners, Giblin & Taylor, 1662 Madison Ave.; architects, Babcock & McAvoy; builder, Michael Giblin.

Eleventh Ave., s e cor. Fiftieth St., two-st'y brick stable and office, tin roof; cost, $2,500; owners, John H. G. Hildebrand, 410 West Fifty-first St., and others; architect, J. M. Forster.

Ridge St., No. 55, rear, four-st'y brick workshop, tin roof; cost, $4,000; owner, Hugh O'Reilly, 45 West Sixteenth St.; architect, Wm. Graul.

Seventy-first St., s s, 250′ e Third Ave., two-st'y brick stable, tin roof; cost, $4,000; owner, Home for the Aged of the little Sisters of the Poor, 207 East Seventieth St.; architect, L. J. O'Connor.

Forty-eighth St., n s, 100′ e Tenth Ave., 6 five-st'y brownstone front tenements, tin roofs; cost, each, $13,000; owner, John Livingston, 981 Lexington Ave.; architect, F. T. Camp.

East Eighty-fourth St., Nos. 163 *and* 165, four-st'y brick store, tin roof; cost, $10,000; owner, Robt. Murray, 221 West One Hundred and Thirtieth St.; architect, Geo. M. Walgrove.

Avenue A, n e cor. One Hundred and Nineteenth St., four-st'y public school, tin roof; cost, $125,000; owner, City of New York; architect, D. J. Stagg.

Seventieth St., n s, 150′ w First Av., three-st'y brick store and dwell., tin roof; cost, $7,500; owner, Wm. M. Hagerty, 224 East Twenty-sixth St.; architect, A. Spence.

West Fiftieth St., Nos. 409 *and* 411, 2 five-st'y brownstone front tenements, tin roofs; cost, each, $12,000; owner, John Fresch, 407 West Fiftieth St.; architect, Wm. Graul.

Eighty second St., n s, 225′ e Ninth Ave., 6 four-st'y brick dwells., tin and slate roofs; cost, each, $11,250; owner, Mary M. Williams, 20 West Twenty-first St.; architect, D. Lionau; builders, B. Blackledge and L. N. Williams.

Eighty-third St., s s, 225′ e Ninth Ave., 6 four-st'y brick dwells., slate and tin roofs; cost, each, $11,250; owner, architect and builders, same as last.

Sixty-first St., s s, 100′ w Tenth Ave., five-st'y brick tenement and store, tin roof; cost, $12,000; owner, Claus Ahrens, Tenth Ave., cor. Sixty-second St.; architect, C. F. Ridder, Jr.

Forty-first St., n s, 75′ e First Ave., two-st'y brick stable, gravel roof; cost, $3,000; lessees, G. L. Schuyler & Co., foot East Thirty-fifth St.; architect, Jas. E. Ware.

Eighth Ave., w s, One Hundred and Forty-fifth to One Hundred and Forty-sixth Sts., and n s One Hundred and Forty-fifth St., from Eighth to New Aves., 15 three-st'y frame dwells., gravel roofs; cost, each, $2,500; owner, Nathan Hobart, 39 West Twenty-sixth St.; architect, T. M. Clark.

Twenty-first St., n s, 168′ w Ninth Ave., three-st'y brick lecture-hall, slate roof; cost, $50,000; owners, General Theological Seminary, L. E. Hoffman, chairman of real estate committee, 426 West Twenty-third St.; architect, Chas. C. Haight; builders, James Bogert and David Hepburn.

One Hundred and Fiftieth St., s s, 350′ w Courtland Ave., 2 four-st'y frame tenements, tin roofs; cost, each, $5,000; owner, Franz A. Knab, 139 East Third St.; architect, M. J. Garvin.

East One Hundred and Twenty-seventh St., No. 70, one-st'y brick stable, tin roof; cost, $700; owner, George W. Martin, on premises; architect, G. Robinson; builders, Burker & Smith and C. B. Brown.

West Fourteenth St.. Nos. 449, 451 *and* 453, running through to Fifteenth St., 2 brick factories, tin roofs; cost, total, $45,000; owners, Johnson & Lazarus, Fourteenth St., cor. Tenth Ave.; architects, Berger & Baylies; builders, M. Reid and Steele & Costigan.

South St., No. 380, one and part three st'y brick building, tin roof; cost, $25,000; owners, R. G. Mitchell & Co., 8 West Nineteenth St.

East Fifty-sixth St., No. 311, four-st'y brick tenement and wagon-house and brick stable, tin roofs; cost, total, $18,000; owner, F. Handrich, 955 Third Ave.; architect, Wm. Kuhles.

One Hundred and Twenty-fifth St., s s, 150′ e Eighth Ave., two-st'y brick store and hall, tin roof; cost, $10,000; owner, Andrew Johnston, 114 West Thirty-ninth St.; architect, G. Robinson, Jr.

West Thirty-seventh St., No. 254, five-st'y brownstone front flat, tin roof; cost, $20,000; owner, John J. Tobin, 351 West Thirty-second St.; builders, Thom & Wilson.

Fifty-eighth St., s s, 200′ w First Ave. and 320′ w first Ave., 6 five-st'y brownstone front flats, tin roofs; cost, each, $16,000; owners, Thos. Moore and Bernard Wilson, 323 East Seventy-ninth St.; architects, Thom & Wilson.

Sixteenth St., n s, 100′ e Seventh Ave., 6 five-st'y brick and stone flats, tin roofs; cost, each, $18,000; owner, Michael Schachtel, Jr., 101 Seventh Ave.; architect, Wm. Jose.

Tenth Ave., e s, One Hundred and Sixty-third to One Hundred and Sixty-fourth Sts., 5 three-st'y frame dwells., slate roofs; cost, each, $5,000; owner, Martin B. Brown, 770 Lexington Ave.; architects, D. & J. Jardine.

Eightieth St., n s, 120′ e Madison Ave., 4 four-st'y brownstone front dwells., tin roofs; cost, each, $18,000; owner, Ed. Kilpatrick, 342 East Seventy-ninth St.; architects, D. & J. Jardine.

Alterations. — *Broad St., No.* 61, internal alterations; cost, $10,000; owner, Catharine T. Kimhardt, New Brighton, S. I.; architects, Lederly & Co.

East One Hundred and Ninth St., No. 169, three-st'y brick extension with new store front; also, roof; cost, $3,000; owner, Hugh Coogan, on premises; builder, Arthur Arctander.

East Seventy-fifth St., Nos. 12 *and* 14, one-st'y brick extension to each house; cost, $5,000; owner, Wm. S. Maddock, 313 East One Hundred and Twenty-third St.; Superintendents, Maclay & Davies.

Broadway, No. 68, make sub-basement and alter basement front; cost, $7,000; owner, Harvey Kennedy, Windsor Hotel; builder, S. H. Mapes.

Third Ave., Nos. 1227 *and* 1229, fronts altered; also, internal alterations; cost, $5,000; owners, Catherine M. Jones, 707 Fifth Ave., and others; architect, Henry J. Hardenbergh.

Broadway, Nos. 1237 *and* 1239, three buildings to be raised one st'y, front walls taken down and rebuilt; also altered internally; cost, $40,000; owner, Edward F. James, 832 Seventh Ave.; architects, J. B. McElpatrick & Son.

Second St., No. 80, raise one-st'y and a three-st'y brick extension; cost, $4,000; owner, Emilia Sauer, 78 Second St.; architect, F. Bernhardt; builders, M. Schwartz & Sons and M. Schmackenbacher & Sons.

West Eleventh St., No. 145, raise two stories and a five-st'y extension; rebuild front wall and internal alterations; cost, $20,000; owner, Jas. J. Lyon, 123 West Eleventh St.

Mulberry St., No. 200, raise one st'y; cost, $5,500; owner, Methodist Book Concern, Sandford Hunt, agent; builder, Wm. B. Whitlock.

Harrison St., No. 11, raise two and a half stories, new flat roof; cost, $3,500; owner, Delia Connelly, 30 Beach St; architect, Wm. Graul.

Eighth Ave., Nos. 645 *and* 647, 2 one-st'y brick extensions and internal alterations; cost, $3,500; owner, Samuel T. Townsend, Brooklyn; builders, John Ruppert and John H. Many.

West Thirty-sixth St., No. 216, raise roof two feet and a four-st'y brick extension; cost, $4,000; owner, Thomas McGowan, on premises; builder, Smith T. Brush.

One Hundred and Tenth St., Nos. 153 *to* 171, new store fronts; cost, $4,000; owner, Abraham Steers, One Hundred and Twenty-fifth St. and Harlem River; architect, G. Robinson, Jr.

Warren St., No. 17, internal alterations; cost, $7,500; owner, St. Peter's Church, Westchester, Philip H. Ade, Clerk to the Vestry, 31 Nassau St.; architect, John W. Ritch.

West Fifteenth St., No. 27, three-st'y brick extension; cost, $5,000; owners, Ellen F. Baxter and Abbie Baker, on premises; architect, H. E. Ficken.

Sixth Ave., No. 357, internal alterations; cost, $4,000; owner, Mrs. Pell; lessee, Patrick McCann, 242 East Thirty-second St.; builder, P. J. Walsh.

Warren St., No. 19, three-st'y brick extension; owner, St. Stephen's P. E. Church, Edwin K. Lineo, Clerk to Vestry, 41 Broad St.; architect, M. C. Merritt.

Prince St., Nos. 103, 105 *and* 107, raise attic to full st'y, new flat roof, and a two-st'y brick extension; also, internal alterations and new store front; cost, $20,000; owners, John P. Townsend, 55 East Fifty-fourth St., and Edward Tuck, 7 East Sixty-first St.; architects, Lamb & Rich.

Philadelphia.

Building Permits. — *Kenderton St.*, e s, above Tioga St., 4 two st'y dwells., 14′ x 38′; Jos. S. Tomlinson, contractor.

Market St., Nos. 1020, 1022 *and* 1024, three five-st'y stores, 21′ x 177′; Jas. B. Doyle, contractor.

Holly St., e s, n of Hutton St., 2 three-st'y dwells., 16′ x 45′; Louis C. Smith, contractor,

Margaret St., s s, e of Frankford Ave., 2 three-st'y dwells., 16′ x 30′; Margaret Irwin, owner.

Baltimore Ave., s s, e of Fifty-second St., one-st'y school-building, 32′ x 32′; A. G. Moseley, contractor.

Sumach St., w s, between Manayunk Ave., and Righter St., three-st'y dwell., 28′ x 56′; Jno. W. Gilton, owner.

Reynolds St., n e cor. Gardner St., three-st'y dwell., 16′ x 44′; Amos R. Crosta, contractor.

Kater St., No. 1823, two-st'y dwell., 17′ x 50′; And. White, contractor.

Leverington Ave., w s, s of Manayunk Ave., two-st'y dwell., 18′ x 34′; J. T. Rambo, contractor.

Leverington Ave., s s, e of Ridge Ave., three-st'y dwell., 22′ x 48′; J. T. Rambo, contractor.

Thirty-fourth St.. No. 210, three-st'y dwell., 22′ x 80′; W. S. Kimball, contractor.

Tenth St., s e cor. Reed St., one-st'y bake oven, 32′ x 118′; D. M. Blyler.

Newkirk St., Nos. 1223 *and* 1225, 2 two-st'y dwells., 15′ x 26′; Chas. Roth, contractor.

Moyer St., s s, w of Vienna St., three-st'y dwell., 16′ x 30′; J. Graham & Son, contractors.

Spring Garden St. s s, e of Twenty-fifth St., fourth-st'y add. to factory, 50′ x 100′; Fiss, Barnes & Erwin, owners.

Hancock St., e s, n of Oxford St., third and fourth st'y add. to factory, 27′ x 95′; Jas. Hood, contractor.

Martin St., n s, w of Pechin St., three-st'y dwell., 18′ x 33′; Lewis Yourth, owner.

Fifth St., e s, n of York St., three-st'y dwell., and two-st'y stable and carriage-house, 20′ x 50′ and 20′ x 30′.

Sharswood St., n s, between Twenty-fourth and Twenty-fifth Sts., 43 two-st'y dwells., 15′ x 38′; J. M. Sharp, owner.

Seventeenth St., s e cor. Indiana St., third and fourth st'y add. to factory, 20′ x 44′; Jno. Adams, owner.

Hering St., n s, between Cresson and Sharp Sts., 2 two-st'y dwells., 17′ x 34′; Wm. Dunlap, contractor.

Reese St., w s, between York and Cumberland Sts., 11 two-st'y dwells., 14′ x 47′; A. T. Richards contractor.

Eighth St., No. 428, three-st'y store and dwell., 15′ x 60′; Wm. E. Beetem, contractor.

Sixth St., w s, s of Moyamensing Ave., 2 two-st'y dwells., 16′ x 30′; W. J. Smith, contractor.

Rittenhouse St., n s, w of Main St., three-st'y store and dwell., 16′ x 46′; Wm. Garvin, contractor.

River Road, n of Shawmut St., three-st'y dwell., 18′ x 28′; T. M. Davis, contractor.

Filbert St., No. 915, four-st'y store, 16′ x 80′; J. B. Doyle, contractor.

Warnock St., No. 1227, three-st'y dwell., 17′ x 49′; Thos. E. Day, contractor.

East Dauphin St., No. 613, thtee-st'y dwell., 16′ x 60′; Jno. S. Baldt & Son, contractors.

Seventeenth St., s w cor. Locust St., three-st'y dwell., 18′ x 61′; Chas. D. Supplee, contractor.

Poplar St., s s, e of Thirtieth St., 4 two-st'y dwells., 14′ x 40′; Wm. H. Bilyeu, contractor.

Ogden St., n s e of Thirtieth St., 4 two-st'y dwells., 13′ x 33′; Wm. H. Bilyeu, contractor.

Franklin St., e s, n of Columbia Ave., 4 three-st'y dwells., 17′ x 58′; Wm. H. Bilyeu, contractor.

Green Lane, n e cor. Wabash Ave., three-st'y carriage house, 43′ x 83′; J. W. Gilton, contractor.

Auburn St., s s, e of Amber St., two-st'y store and dwell., 14′ x 40′; J. Hallin, owner.

South Tenth St., No. 1321, three-st'y dwell., 16′ x 40′; D. Minage, owner.

Reading R. R. Office, rear of, Fourth St., and Willings Alley, three-st'y brick building, 20′ x 50′; Reading R. R. Co., owners.

Coulter St., n w s, n of Pulaski St., 8 two-st'y dwells., 16′ x 36′; Chas. B. Williams, owner.

East Montgomery Ave., No. 1521, three-st'y dwell., 18′ x 45′; J. H. W. Chesnut, owner.

San Francisco, Cal.

Building Permits. — *Jackson St.*, cor. Webster and Fillmore Sts., 2 two-st'y frame buildings; cost, $7,000; F. Wittram, owner; W. P. Moore, architect; A. Jackson, contractor.

Jackson St., cor. Buchanan St., two-st'y frame building; cost, $6,000; A. Wolters, owner; Kenitzer & Raun, architects; E. Farrell, contractor.

Geary St., cor. Gough St., two-st'y frame building; cost, $7,000; Dr. Stoddard, owner; Schmidt & Havens, architects; Terrill & Slaven, contractors.

Sacramento St., near Fillmore St., two-st'y frame building; cost, $5,000; Wm. Patton, owner; Cook & Johnston, contractors.

Brush St., cor. Webster St., two-st'y frame building; cost, $12,000; J. O. Van Bergen, owner; S. & J. C. Newsom, architects; days' work.

Morton St., cor. Dupont St., three-st'y and basement brick building; cost, $20,000; F. Hellwig, owner; Lueders, architect; Mahoney Bros., contractors.

Ellis St., cor. Polk St. and Van Ness Ave., 3 two-st'y frame buildings; cost, $18,000; Capt. F. Gee, owner; Schmidt & Havens, architects; W. M. Fletcher, contractor.

Ridley St., cor. Guerrero and Market Sts., three-st'y frame building; cost, $4,500; owner and builder, S. D. Matthews.

Valencia St., cor. Twenty-second St., two-st'y and basement frame building; cost, $9,000; J. Schleff, owner; day's work.

California St., cor. Devisadero St., one-st'y and basement frame building; cost, $10,000; Jas. Keane, owner; Kenitzer and Raun, architects; Moore Bros., contractors.

Eddy St., near Jones St., four-st'y frame building; cost, $12,000; J. Conolly, owner; J. Oak, contractor.

Fifth St., cor. King St., one st'y brick building; cost, $10,000; Standard Oil Co., owners; W. E. Stevens, contractor.

Second St., cor. Folsom and Howard Sts., additions to building; cost, $25,000; J. Wieland, owner; J. Haff, contractor.

Fourth St., cor. Berry St., two-st'y frame building; cost, $7,000; Union Ice Co., owner; day's work.

Ridley St., near Valencia St., three-st'y frame

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THE investigation into the charges against the Supervising Architect of the Treasury Department has some amusing features, although no witnesses have as yet been brought to support the accusations. On the contrary, the two principal complainants keep carefully aloof from the committee-room, but pour their griefs into the ears of sympathizing reporters, who promptly publish them to the world. This mode of collecting evidence from two persons separately on the same subject has been the means of throwing an unexpected light upon some of the specifications of the charges which were not quite clear. The last item in the deposition of the former Supervising Architect, for instance, recites that the present incumbent had been guilty of cancelling the system of percentage on contracts for granite-cutting, and substituting therefor specific contracts at fraudulent rates. Most of our readers probably recollect the evidence given some years ago in relation to certain percentages on freestone contracts of the same kind, from which it appeared that the lucky contractor, in order to make his income last the longer, was in the habit of allowing his men to play ball and amuse themselves in various ways, charging the time thus spent to the public account, and collecting fifteen per cent of the amount for his own benefit; and may be surprised that the abrupt termination of such contracts by the present Government Architect, on his accession, should be attributed to him as a crime; but the Cincinnati contracts related to freestone only, and it might have been possible that those for granite were carried out with a scrupulous economy which rendered any change really detrimental to the public interest. Unfortunately, on this point, the testimony of the other principal accuser shows that under the percentage system, at least one granite contractor, not content, like his Ohio brother, to charge the Government a round commission on the time spent by his men in field sports, was ingenious enough to hire a hundred or more apprentice stone-cutters at a dollar a day, charging them to the Government at three dollars and twelve cents each per day, and pocketing the difference, with forty-seven cents each per day additional, as his percentage on the cost of the labor. If the cancelling of such contracts as this is an error in a public officer, it is to be wished that we might have some more criminals of the same kind in stations of responsibility.

THE matter of the bequest of the late Levi Hale Willard, for the purpose of founding an Architectural Museum in New York, has been taken up with zeal by the architects of that city, and a commission has already been chosen by the New York Chapter of the American Institute of Architects to aid in carrying out the intention of the generous donor. Of course, some time must elapse before the gift is entirely available, and an understanding between the commission of architects and the Trustees of the Metropolitan Museum of Art, which is the conditional legatee, is essential to the taking even of the first step, but there is no doubt of the goodwill of both bodies, and nothing will need to be arranged but the details of the scheme. Unfortunately, one of the first details to be arranged is the very important one of finding room to place the collection, or any part of it, when it is got together. The available space in the present building of the Metropolitan Museum is more than filled by other works of art, while many objects already purchased remain in their cases in the cellar, for want of room to display them. Under these circumstances, the question of accommodation for a new collection of such bulky articles as an architectural exhibit would naturally comprise is a serious one, and it is very likely that an appeal to the public for funds to erect an additional building will be necessary before Mr. Willard's bequest can be accepted.

WE owe an apology to two of our contemporaries for having allowed some weeks to elapse before saying what we might to welcome them to the field of technical literature. The *Builder*, published monthly by Clark W. Bryan & Company, at Holyoke, Mass, and edited by Mr. E. C. Gardner of Springfield, shows all the taste and knowledge of architectural matters which Mr. Gardner's books have displayed, set forth in the pleasant and suggestive style which most of our readers know so well. We should hardly wish, understanding, as we do, the difficulties of the undertaking, to criticise minutely the early numbers of a technical journal, even if we found anything to object to, but in the present instance our malice, if we had any, would be disarmed by the intelligent, well-bred and, at the same time, business-like character which pervades all portions of the paper, and will, we may be sure, continue to distinguish it as long as Mr. Gardner conducts it. The other new-comer is the *Inland Architect and Builder*, published monthly in Chicago by the Inland Publishing Company, and containing primarily such information in regard to local building matters as may be most acceptable to the profession in that busy place. It is surprising to see how much matter of this kind there is, and it is pleasant also to observe the skill and care with which it is sifted and arranged. The editorial paragraphs in the two numbers which have so far appeared seem to us of unusual value and interest, and we take pleasure in congratulating the profession in the West upon the high character of the journal which promises to represent it.

THE City Council of Milwaukee, Wisconsin, has appropriated a sum of money for procuring model school-house plans for buildings of four, eight, and fourteen rooms, which are, after careful selection, to be adopted as standards, according to which all future school-houses in the city are to be built. We have not learned the particulars of the scheme, but it certainly shows a praiseworthy desire on the part of the government to secure the benefit of modern architectural science for all the children under its care, instead of a small number of high school scholars, who generally, in our towns, enjoy a monopoly of such professional skill as the municipality calls to its assistance. There is, undoubtedly, a good deal of danger that plans suited for a given site, with a certain orientation, may not be so well adapted for a different location and distribution of sunshine; and the most satisfactory way would be to have the best possible plan drawn independently for such building; but this might be impracticable, and we can at least be sure that a good plan for such a structure will give, however turned around or misplaced, a result infinitely superior to the ordinary creations of unskilful school-committees and cheap architects or builders. We hardly comprehend, in this country, how far we are behind all other civilized nations in the matter of school-house architecture. While our school-house furniture is universally acknowledged to be the best, the lightest, and the most scientifically and ingeniously adapted to promote the comfort and health of children of any in the world, the buildings in which we usually place it would not be tolerated for a day in any school district in England, France, or Germany. This is partly owing, no doubt, to the feeble hold which architecture, as a science, has yet secured upon our every-day life, and partly, perhaps, to the peculiar methods of carrying out public works which the necessities of our politics are apt to impose upon those who administer such affairs; but there are signs, particularly in the innovating and energetic West, of a new and keen interest in the welfare of the younger portion of the community, and we may hope that this will ultimately lead, in other places than Milwaukee, to the radical amelioration of the places where children spend most of their waking hours, during

the most susceptible period of their physical and moral lives, and in which they receive their strongest and most lasting impressions.

MR. ADAM F. BANDELIER, the brave and learned agent of the Archæological Institute of America, after a short rest, which was found necessary in order to enable him to recover from a serious affection of the skin of the face, brought on by freezing during one of his journeys in the Indian country, set out a short time ago, under the direction of the Institute, to visit the wild and little-known tribes of northern Mexico, among whom he hoped to find traditions and modes of life less modified by foreign influence, and approaching more nearly to those of primitive times, than exist at present anywhere else on the continent. After a short stay with Mr. Cushing, at Zuñi, which happened to lie in his way, he departed a few weeks ago, apparently not without misgivings, for the wilderness of Sonora, where, after experiences which we can only imagine, he was taken prisoner by Indians of a tribe which has recently risen against the Mexican government, and carried away into the mountains. The first accounts of his capture which were received left hardly any doubt that he, with one white companion and one friendly Indian, were subsequently murdered by the savages, with the tortures which Indians delight so much to witness, but a more recent dispatch brings the gratifying intelligence of his escape and safe arrival at a military post of the United States. What may have been the details of his journey we cannot even surmise, but every one must rejoice at his escape from the hands of the barbarians.

A QUESTION was propounded not long ago to the editor of *La Semaine des Constructeurs*, of a kind which is not uncommon in France, where the custom of decorating rooms with mirrors is much more general than with us. It seems that a certain individual bought a house containing eight fireplaces, with mantels, each of which was surmounted by a large mirror attached to the wall. Four of the mirrors were secured, as is customary there, to frames of wood-work forming a part of the furring, so as to bring the surface of the glass in the same plane with the plastering, a moulded frame only being placed around them, and projecting from the wall. The other four were attached to the plastering. On taking possession of his house he discovered that the mirrors had all been removed, and laid claim to them, but was answered that they were merely furniture, and as such had not been sold with the building. Nothing had been said about the mirrors in the contract for the sale of the house, and the purchaser, therefore, sought the advice of the editor concerning his rights. The response to his inquiry informs him that according to the *Code Civil*, the mirrors of an apartment constitute a part of the building, when the framework on which they are fixed forms an integral part of the wood-work of the room; pictures "built in," as we say, being regarded in the same light. With regard to mirrors placed against the wall the law is not so clear, but the decisions of the higher courts indicate that any objects of the kind which form a part of the scheme of decoration of the room are to be held as belonging to the building, even though they may be simply placed against the plaster. In the case in question, the fact that the paper on the walls was interrupted at the frame of the mirrors, instead of passing behind them, showed that they were not intended as movable ornaments, but as a part of the permanent decoration, and as such the new owner could justly reclaim them.

THE bill to incorporate the Meigs Elevated Railroad Company, after passing the lower house of the Massachusetts Legislature by a majority of nearly two to one, was rejected in the State Senate, which a year ago passed the same, or a very similar bill, by a considerable majority. Several reasons are mentioned for this refusal of the fifth request for incorporation made in that State by elevated railway companies, but there can be little doubt that the influence of the existing railway corporations had much to do with the defeat of the bill, after the two houses separately had at different times pronounced themselves in favor of it. It is obvious enough that, granting the practical success of Captain Meigs's invention, the creation of a company authorized to build railroads costing for construction and land damages less than one-third as much as those now existing would be a serious matter for the present corporations, and it is not strange that personal arguments of the strongest kind should have been brought to bear upon such members of the Legislature as might be amenable to the resentment of those powerful bodies. Independent of the effect of the rejection of the bill in preventing any attempt to establish railroads on the Meigs system for public use, it appears that under the general railroad law of Massachusetts the inventor is, until some sort of act is passed for his relief, prohibited even from constructing an experimental line on his own, or any other person's land within the State. The statute expressly says that all railroads built in Massachusetts shall be of the standard gauge, and as a single-rail track is certainly not of the standard gauge, it would, as it seems, be a misdemeanor to build anything of the kind. Whether Captain Meigs and his friends will persevere in their attempts to gain a foothold in their own State, or carry their models and money to some more hospitable community, is apparently not yet decided.

THE various telegraph, telephone and electric-light companies in New York have done a sensible thing in holding a conference, at which representatives of all the companies interested were present, by invitation, to consider the best method of placing and maintaining underground wires for the common benefit of all. It is evident that if electric wires are to be placed below the surface, it will be much more economical to adopt a mode by which a conduit large enough for the lines of all the companies can be laid at the common expense, than to employ independent conduits, while the wires will be more easily cared for under a comprehensive system, so that the best efforts of the associated companies are likely to be put forth to attain this object. No plan at present in use seems to have met with the approval of the delegates to the meeting, but a committee was appointed, with power to consider the subject, and adopt such measures as it might deem advisable in furtherance of the common object. In Chicago, where, it will be remembered, an ordinance was passed some time ago requiring all corporations using electric wires to remove them from the streets on or before May 1, the telegraph companies have prepared for resistance, and threaten, in case their wires are forcibly removed, as has been proposed, to close all their offices in the city, and leave the city without telegraphic communication. There is a good deal in this threat, and the result will probably be that the wires will remain where they are, at least for the present.

A NEW material for brick-making has been employed recently, in the shape of cork-dust, which is collected at the manufactories where that material is worked into shape, mixed with mortar of lime and clay, and moulded in the usual manner. On drying, these cork bricks are found to possess a resistance of nearly fifty pounds to the square inch, and are readily put together with lime or cement into the ordinary forms of masonry. As might be supposed, they are very light, weighing about one-third as much as an equal bulk of water, and are very slow conductors of heat and moisture. These properties give them a special value in the construction of partitions which need to be very light, as well as sound-proof and strong; while their imperviousness to heat and moisture makes them an excellent material for furring damp walls, and for lining ice-chests and beer-cellars. It seems probable that a similar concrete might be made here with saw-dust, and if it could be furnished cheaply, it would probably soon find an extensive application for deafening floors and partitions, casing water-pipes, and furring brick walls. For the latter purpose it might, we should imagine, be nearly as fire-resisting as the cement or plaster blocks now employed for the purpose in fire-proof buildings, and would, of course, be much less costly.

ACCORDING to the *Builder*, the recent dynamite explosion at Westminster had some singular results; in many cases the most fragile objects in the rooms of the adjoining buildings being unharmed, while massive pieces of furniture close by were torn to pieces. In a bed-room in the Local Government Board Office, close to the spot where the dynamite was placed, a heavy clothes-press was blown into small splinters, while a toilet bottle and glass on the mantel were uninjured. The glass face of a clock, also on the mantel, was torn off, and a picture hanging near vanished completely away, but a companion picture hung beside it was found quite undisturbed. Whether this difference in the effect of the explosion upon various articles is due to the character of the currents of air which reach them seems to be quite uncertain, but the subject is worthy of farther investigation.

BUILDERS' SCAFFOLDING.—XI.

FRENCH.—HOTEL DE VILLE, ETC.

THE scaffolding for the reconstruction of the Hôtel de Ville, Paris, which was destroyed by the Paris Commune, in May, 1871, ordered to be rebuilt in 1873, and is expected to be completed in July next, is the largest (with the exception of that for the Exhibition Building of 1878) and the most complete that has been erected in Paris for some time. It formed a quadrangle around the exterior of the building of 497 feet by 427 feet, affording a continuous working-platform all around the exterior of the entire building, at any one level of over 600 yards lineal. This is independent of the scaffolding all around the interior quadrangle inclosed by the building itself and erected at the same time. The height of the scaffold at the angle towers is 120 feet, and at the other portions of the building the height is 90 feet. It was designed with great care by the architects, as is required by the building regulations in France. The French architect is also required to design all staging, centres, and false-works required for turning or building vaultings, arches, etc. We have reproduced a photograph [*see Illustrations*] giving a panoramic view of this forest of scaffold poles, as it gives a good idea of the magnitude of this skeleton structure.

To sustain a structure of necessarily temporary character under the imposed conditions, a considerable portion of it being 120 feet high, which during the earlier stages of the building is fully exposed unshielded to the fury of the winds, involves considerable experience in the erection, so as to economize labor and expense in handling heavy spars at this height without extraordinary appliances and auxiliary false-works, and also avoid danger to life or limb during the progress of the operations. The photograph here reproduced was taken from the roof of an adjacent buildtng when the walls had reached a considerable height. In some parts the second floor is shown—as in the left-hand lower corner. It is laid in perforated-brick arches on iron joists. The plan of the main walls of the building is well depicted in the midst of the surrounding maze of scaffolding.

A peculiarity of scaffolding in France and in England is its erection complete in advance of the prospective building, and the great importance with which the French State authorities properly regard scaffolding, and indeed all regulations which appertain to building construction. The standards consist of long spars, nine inches to twelve and even up to fourteen inches in diameter at their butts; the heavier spars being put lowermost, the upper lengths gradually decreasing in diameter. The successive lengths are spliced together with an oblique *halving* joint, with a tongue and groove at the upper and lower butting surfaces of each joint, and bolted together as shown in Figure 24.

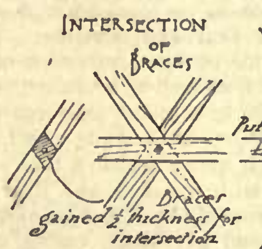


Fig. 26.

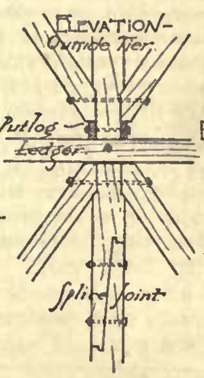


Fig. 24.

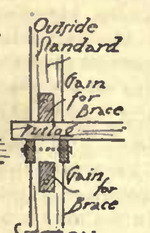


Fig. 25.

They are set up at regular intervals, upon sleepers into which they are gained. The inner tier is set some distance from the main wall, to admit of running a continuous gangway or platform between, all around the building, at any required interval up the height of the wall as it progresses. The putlogs project inside the standards towards the wall, so as to support this gangway. The outside tier is set apart from the inner tier, say, twelve to sixteen feet, each standard of the one tier being set perpendicularly opposite to the corresponding standard of the other tier. The horizontal timbers or ledgers consist of a pair of scantlings abreast on both sides (front and and back) of the standards, and gained-in and bolted to them, as shown in Figure 25, above are the putlogs. The scantlings are, say, four to six inches by eight to ten inches. The outside tier of standards is braced longitudinally in that portion lying between the pavilions and the central façade, in alternate diagonals, and reaching to the third ledger above; *i. e.*, they extend upwards over three successive horizontal intervals between ledgers. The portions opposite the centre and the pavilions have double diagonal or cross-bracing, some of the tiers of this bracing intersecting at a ledger, all being gained-in between the ledgers, where they intersect them, and all firmly bolted together, as shown in Figure 26. The feet and heads of the braces are gained into the standards at a ledger, and all bolted together, as shown in the figure, in which the ends of the putlogs are shown in position.

Figure 25 is a cross-section of Figure 24. All the outside longitudinal bracing-panels correspond in height in both the single and double bracings. The brace spars are lighter than the standards. Raking transverse shores, reaching to about one-third of the height of the standards, are gained and bolted to the outside tier, the feet of the shores being properly secured against sole-pieces. The lower tiers of putlogs, which consist of pairs of scantlings abreast, of about three inches by six or eight inches, are gained and bolted to both the inside and outside tiers of standards, and also to the raking shores. They project beyond the inside tier of standards towards the wall, for the purpose of supporting the platform or gangway. Where necessary they are *gusset*-braced, as shown in Figure 27.

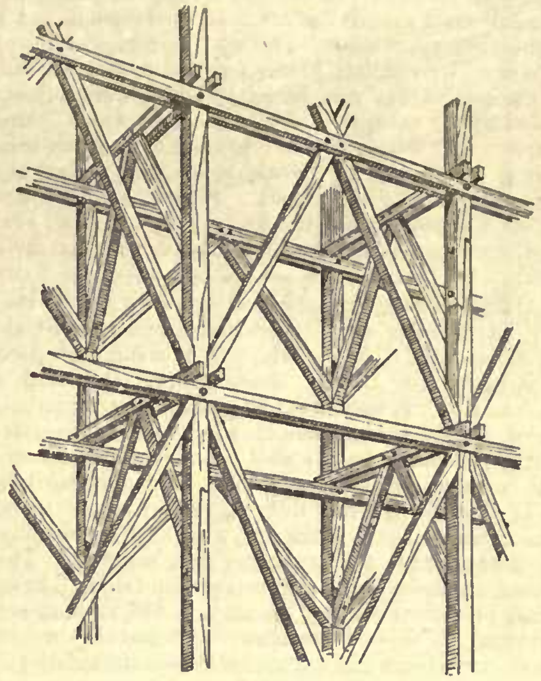


Fig. 27.

The longitudinal bracing of the inside tier of standards is shown in Figure 28; it is after the manner of the *gusset* system of bracing—the pieces butt together obliquely at the top between, and bolted to the ledger pair of scantlings. At the pavilions the bracing is similar to the single bracing of the outside tier, with counterbraces in some of the upper tiers of panels.

Transverse bracing between the outside and inside tiers of standards is similar to that of the inside tier of standards of the gusset system, the pieces gained and butting obliquely together between the pair of scantlings composing the putlogs. Figure 29 shows these two kinds of bracing in perspective. It is a portion of the scaffolding belonging to a public building erected in Paris some years ago. The pavilions have flying or jack standards introduced at the top between the main standards. They are footed upon the intersection of the upper tier of main diagonal braces.

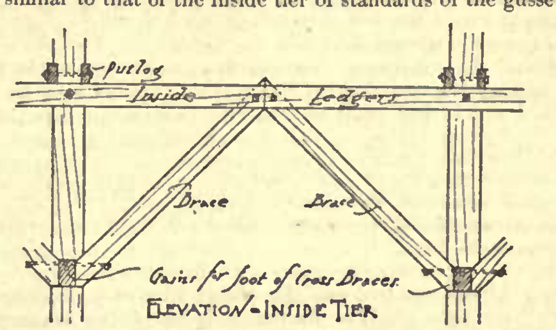


Fig. 28.

At the pavilion where the line of the façade recedes, the returns of the scaffolding around the re-entering angles are doubled in width. The return ledgers continue through both widths of scaffolding, as well as along the intervening *return* side, *i. e.*, through the end of the part of the scaffolding in advance, as well as that portion which retreats behind it in the same main façade. This arrangement reinforces the stability by the double breadth of bracing at these points, *i. e.*, the

longitudinal bracing of the *return* portions, all combining to make a very stiff system.

In order that the standards may be at regular intervals along the centre of the east and west façades, and yet not obstruct the approaches to the quadrangle through the large arched carriage-ways, the standard which would come opposite to the centre of the archway is made a flying standard resting on the intersection of the diagonal braces, which occurs at a lower ledger, in a similar manner to the jack standards at the top of the scaffold above described.

The scaffold on a portion of the north façade, where there is a lower or curtain wall, is formed of a single tier of standards corresponding to the inner standards of the double tier. Figure 29 is a specimen of this method of construction, and shows the combination

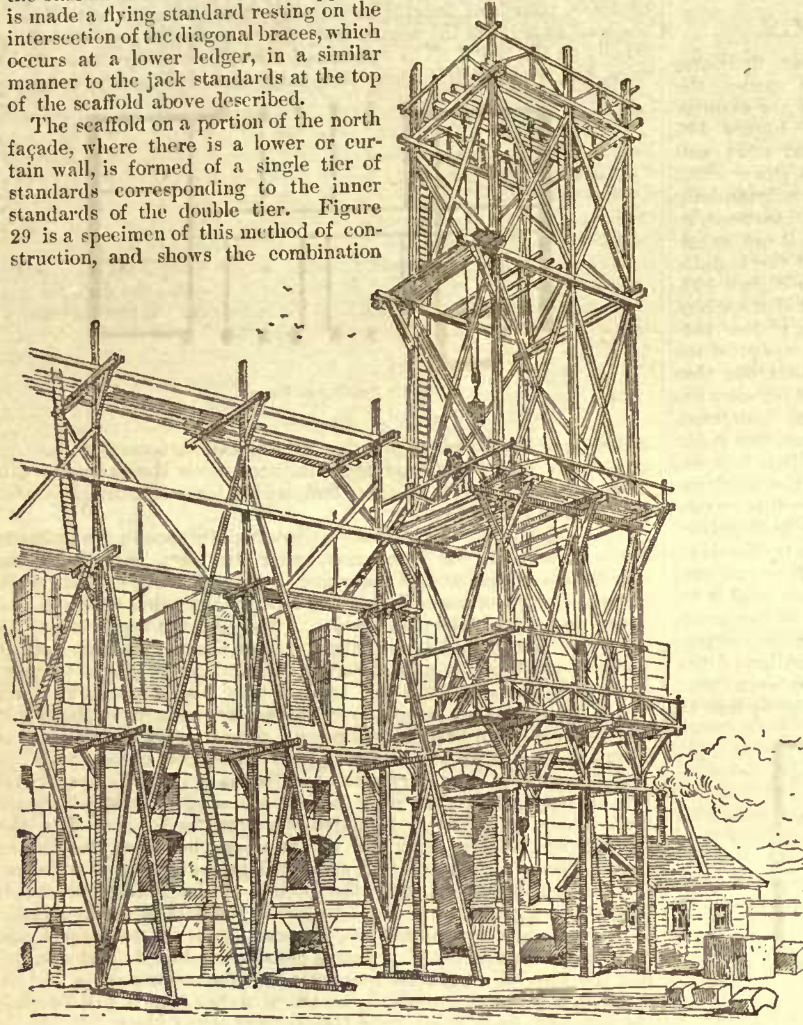


Fig. 29.

of the parts distinctly. It will be observed that the bracketed putlogs, each composed of a pair of scantlings, embrace the standards, and also the transverse raking shores there shown, and the heads of the diagonal bracket-pieces are gained and bolted between the ends of the putlogs which support the platform or gangway. These act as *struts*, whereas the long braces at the other end of the putlogs act as *ties*. It usually extends from the next lower ledger, the lowest tie extending from foot of standard. Sometimes this latter brace does not quite extend to the putlog, but is bolted to the raking shore just below it, and acts as a stay to the shore. The alternate standards are shored longitudinally both ways by long braces extending to the foot of the intermediate standards, and to a higher point on the alternate standard than the transverse shore reaches; they are bolted to all intersecting ledgers. Auxiliary bracing is introduced from the intersection of the main longitudinal shore with a lower ledger, and extends as high on the intermediate standard as does the main-brace on the alternate standard.

The standards and transverse shores are footed upon the same transverse sole-pieces. Ledgers or longitudinal ties connect the standards together at certain intervals in the height, where gangways are laid on the bracketed putlogs. This description of scaffolding is only intended for light work, as the design is not suited to carry heavy stones.

A temporary inside pole-scaffolding is also shown, on which the ends of transverse planks may rest. Ladders are fixed to the scaffolding between the permanent gangways.

Stationary hoists or *sapines* are distributed at several points around the façades at the Hôtel de Ville, and reach considerably higher than the scaffolding, to allow room for tackle-hooks, counterweights, slings for blocks of stone, crate or basket suspension-chains, etc. They consist of four corner spars of rather heavier scantlings than the scaffold standards, and also four interior standards, so placed that the workmen's stairs occupy the larger central space — the two smaller spaces, one on each side, being occupied by the successive landings between the flights. The whole assemblage of standards is tied together all around at successive heights by double ledgers and putlogs abreast, all gained and bolted to the standards as in the scaffolding. The stairs are formed of cut plank strings and plank steps; along the sides of the stairs are the hoisting arrangements for raising the materials.

The same arrangements of flying-standards above described are introduced at top to support a beam or girder, which carries the hoisting-tackle. There is a winch or crab attachment for hand-power. If the hoisting is worked by steam-power there is a belt-and-pulley attachment which is driven from line shafting, worked by a donkey-engine.

For the larger class of tenement buildings the *sapine* shown in Figure 29 is usually employed. It is constructed of six standards, in two tiers, longitudinally, of three in each. It is cross-braced diagonally in each bay, all around the structure. The ledgers and putlogs are bracketed outside of the outline, on which is formed a plank gangway with hand-rail, to afford facilities for moving plank across the hoist, under blocks of stone or crates of brick, mortar, etc., as they are hoisted up to the required height for distribution to the masons. Two or more hoist tackles are intended to be in operation side by side at the same time by means of steam-power.

For smaller tenement-houses the *sapine* consists of four standards — similarly cross-braced all round in successive panels or stages. The surrounding plank gangways are omitted in the smaller class.

As Paris façades are principally built of solid ashlar, of the full thickness of the wall without any rubble or brick backing, a large quantity of heavy blocks of cut stone have to be hoisted to the required heights. The blocks of stone are usually caught in slings made of an assemblage of soft cords. The stone blocks or baskets are hoisted a few feet above the point of landing, heavy planks are then laid across the *sapine*, underneath, and the stone, etc., lowered upon them, and it is then moved on rollers along the gangway or upon planks laid upon the wall to the point where it is to be set in the wall.

Temporary ledgers are lashed across the *sapine* at heights corresponding to the advancing of the wall, and there support the cross-planks above alluded to.

This is a tedious and clumsy process and seems unworthy of a large metropolitan city like Paris, and why the French mechanics are content to continue it is unaccountable. It is much behind the American or English derrick, and the Scotch "Gabbert" crane is in advance of both, and has much to recommend it, and it seems a wonder that it is not adopted in its entirety by the enterprising contractors of this country. It is being gradually introduced into the north of England. The principal derrick-crane works in Scotland are at Glasgow; there are also two firms in Leeds, England, who make these cranes both for steam and hand power.

Figures 30 and 31 show a form of adjustable chain-stays (alluded to in the October number on p. 170) which is used in Paris, in a few instances, to fasten the ledger to the standard, instead of the usual rope lashings, also described in the same page. The screw-stud is held against the standard on the outside, so that the chain attached to it shall be in level range with the upper edge of the ledger. The chain is fastened to the collar by means of a ring or eye in a lug in one side of the collar, and on the other side of it to a hook, whereby the hook can enter a link of a suitable length of chain, and then be tightened by the screw raising the collar farther from the standard.

For the purpose of raising into position in the scaffold the large spars of which it is composed, and afterwards removing them, a mast-and-gaff arrangement (*chevre à cheverette, système Gerbald*), sometimes called the Devonport derrick in England, to which a winch is attached, is usually adopted. The mast is held in position by guys or back-stays in different directions. The gaff has a half-circle jaw which embraces the mast, a rope passing from the throat to the top of the mast. The top of the gaff, which is sometimes slightly inclined

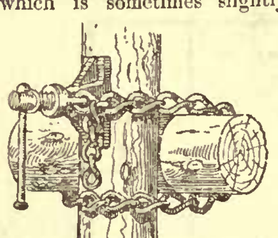


Fig. 30.

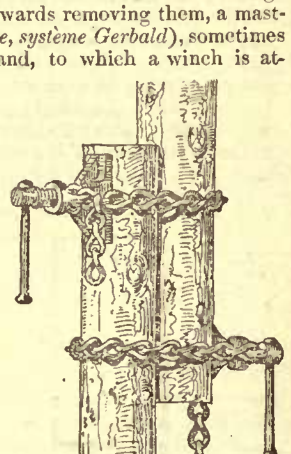


Fig. 31.

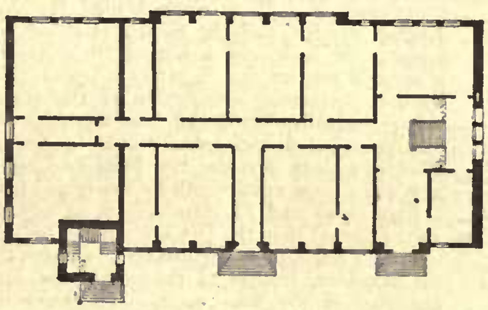
upwards, is held by a stay to the top of the mast. Swing-guys are also attached to the end of the gaff for the purpose of swinging it round the mast to lift or lower the spar in convenient positions. The hoisting-rope is suspended from the projecting end of the gaff, the fall passing through a block hooked to the throat.

Sometimes a shear-pole derrick is employed, with a winch attachment. The poles or legs are pinned together with a number of shouldered rails let into mortises in the legs, the ends being fastened with wood pins; the feet of the legs are tenoned into horizontal sole-pieces. A

block-and-tackle, the fall of which is fastened to the barrel of the winch, is made fast to the head of the derrick or *cheverette*, the lower block being hooked to a grommet[1], which encircles the spar above the middle point, so that it will swing nearly vertical when raised by the winch. Guys or back-stays run through blocks at the top of the derrick for the purpose of changing its inclination.

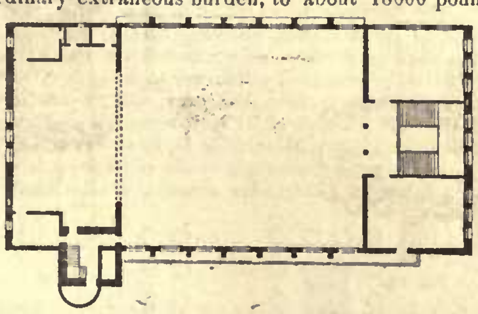
BUILDING SUPERINTENDENCE.—XXIX.

WE can now draw our definitive plans of the several stories, the horizontal section of the exterior walls being determined. Figure 190 shows the plan of the first story, and Figure 191 of the second story. The walls in the first story are substantially the same as those of the basement, so that a plan of the latter is not necessary, and we may lay out the foundation at once, as shown in Figure 192. In this it will be observed that each of the interior walls, and the plainer portions of the exterior walls, are provided with continuous foundations, but that the masonry is interrupted between the piers which support the buttresses above, although in elevation this space is occupied by a wall, which fills the area around and under the windows. One may naturally ask why this curtain wall, light as it is, should be deprived of a foundation, and it would be more usual, in fact, to lay footings for this portion of the masonry, as well as the rest. Nevertheless, an attentive study of the conditions will, we think, show that it is, under the circumstances, wiser to support this portion of the building upon isolated piers, than to build for it a continuous footing, which must be very unequally loaded. A rapid computation of the weight of the piers, as compared with that of the wall between them, will show that the former, which are approximately $1\frac{3}{4} \times 3\frac{1}{4}$ feet in



First Story Plan
Fig. 190.

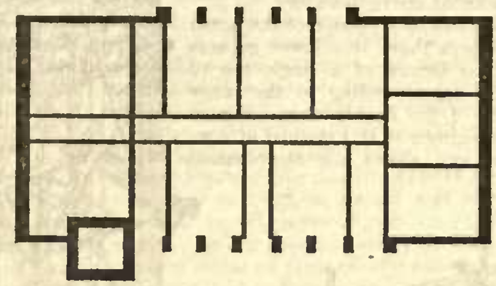
section, and about 68 feet in height from the level of the basement floor, 8 feet below the curb, to the eaves, contain each about 378 cubic feet of masonry, weighing, at 112 pounds to the cubic foot, 42336 pounds, to this being added the weight of the curtain walls around the second-story windows, which, as we remember, are supported entirely from the main piers, by segmental arches sprung between them, and weigh, for the portion resting on each pier, about 23000 pounds. Besides this, the roof-trusses, which bear wholly upon the piers, bring on each an additional load, as we have seen, of 22320 pounds; while the weight of the second-story floor, although framed with beams at short distances apart, is also brought by the segmental arches just beneath it entirely on the piers, adding to the load on each the weight of $\frac{12 \times 30}{2} = 180$ square feet of flooring, equivalent, with its ordinary extraneous burden, to about 18000 pounds. The



Second Story Plan
Fig. 191.

weight of the first story and basement floors would be divided between the piers and the curtain wall in a proportion which can hardly be estimated exactly, but about one-half of it would probably come on the piers, making, for two floors, an additional load of 18000 pounds. Adding these together, we find the total pressure at the level of the basement floor upon the substructure of the piers to be 123656 pounds. Dividing this by the sectional area of the piers at that point, which is $5\frac{1}{2}$ square feet, gives 22483 pounds as the pressure per square foot.

On the foundation wall between the piers we shall have the weight of 18000 pounds of flooring in first story and basement, with that of the wall as high as the second-story floor; everything above resting wholly on the piers. The openings for windows occupy most of the area, but we have left about 300 cubic feet of masonry, weighing



Foundation Plan
Fig. 192.

33600 pounds; the whole pressing upon the substructure of that portion of the building, whose sectional area below the basement windows is $10\frac{1}{2} \times 1\frac{1}{4} = 13\frac{1}{8}$ square feet, with a force amounting to 3820 pounds per square foot.

This calculation discloses a very great difference in the intensity of the pressure on the foundation under the piers, and that of the wall between them, and as the masonry of rough stone extends below the basement floor seven feet to the tops of the piles, we have just reason to fear that the compression of the joints in this masonry beneath the piers would be so much greater than in the intermediate portion, subjected to a load hardly one-sixth as great, as to cause some dislocation between the two parts of the stone-work, which would probably show itself above ground by fractures in the sills of the basement and first story windows, as well as by the opening of seams in the angles between the buttresses and the curtain wall.

If the ground were very soft, so as to make it unsafe to increase the load upon any part of it beyond a limited amount per square foot, it might be best to equalize the pressure by spreading the footings of the piers until the weight upon them was distributed over so large a surface as to make the pressure upon each foot of this surface equal to that on the footings of the curtain-wall, but it would take a great deal of stone to spread the base of the foundation to the requisite extent, and we, who can count in the present case upon a pile foundation of tolerable resistance, shall do best to abandon the idea of a separate foundation for the curtain walls, and arrange to support the whole, by means of arches turned just beneath the basement floor, solely upon the footings of the piers.

Although the pressure upon these will be increased by so doing, we can easily provide piles enough to sustain it all, and the curtain-walls, being now entirely dependent upon the piers, will settle with them as the joints are compressed under the weight of the superstructure, instead of being torn away from them by the reaction of the less strongly weighted stone-work upon which they themselves rest.

Further consideration convincing us that this is the best, as well as most economical method of construction, we have only to indicate the underground arches which we propose, as shown in Figure 193,

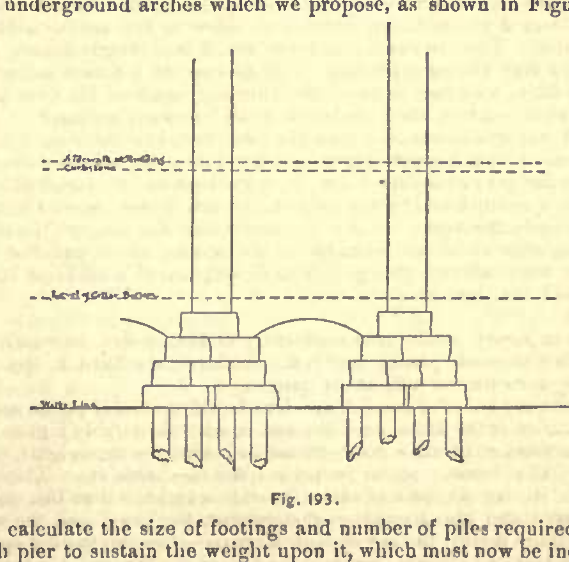


Fig. 193.

and calculate the size of footings and number of piles required under each pier to sustain the weight upon it, which must now be increased by that of the curtain wall in first story and basement, above the arches, and also by an amount representing roughly the weight of the foundation below the basement floor, which, of course, can be only provisionally determined.

Before making up our minds on this point we shall do best to test

[1] In this case a grommet is a single loop or ring of rope of suitable length to double flat around the spar, one double end of the flat loop serving as an eye for the other double end to run through, and hook to the hoist-rope.

the resistance of the hard-pan to which the piles are to be driven by actual trial, and will therefore lay out the piling-plan for the plain walls, and begin work.

Although the ground is softer than we could wish, the piles bring up generally in a stratum which allows them to sink only $2\frac{1}{2}$ to 3 inches at the last blow of a hammer weighing 1600 pounds, and falling 15 feet. This, by Sanders's formula, indicates a safe resistance for each pile, in the worst cases, of $\frac{180\times1600}{3\times8} = 12000$ pounds, or six tons. We will therefore assume this as the load to be assigned to the piles under the piers, and will draw the plan accordingly, remembering that it will be necessary to watch the driving closely, so that if a soft spot should be met with, in which the piles should sink more than three inches under such a blow, additional piles can be at once staked out and driven, sufficient in number to divide the total pressure into portions small enough to come within the limit of their safe resistance, as found by a new calculation.

Down to the basement floor, the sum of all the weights borne by each pier is 175256 pounds, which would just be sustained by fifteen piles, driven to a bottom as hard as that which we have already found. We must not, however, forget that a considerable cube of masonry will intervene between the top of the piles and the basement floor, whose weight must be taken into account. The distance between these two points is seven feet, and six feet, at least, of this must be of heavy stone masonry. The remaining foot may be of brick, like the superstructure. Supposing, simply for calculation, that one extra pile would be sufficient to carry the additional weight of the foundation, we should have under each pier a group of sixteen piles. These are always most advantageously arranged in pairs, so that the stones which rest upon them, the "cappers," as they are called, may each cover two piles, and no more. It is also desirable, for the sake of saving stone, to place the piles as near together as they can be driven without forcing each other aside, or unduly disturbing the bed, and the minimum distance for this purpose being two feet from centre to centre, in such ground as that with which we have to deal, the natural disposition of our sixteen piles will be in the form of a square, measuring 6 feet on each side, from the centres of the piles. In order to cover these entirely with the capping stones, it will be necessary, as the head of the piles is from 10 to 12 inches in diameter, to make the first course 7 feet square. The second course, in order that the weight may not be thrown too much on the inner part of the capping stones, should be 5 feet square. The third course may be 3 feet by 4, and the fourth course the same. Each course will be about 18 inches high, and the whole amount of stone-work will be 147 cubic feet, weighing, at 125 pounds per cubic foot, 18375 pounds. The extra foot of brickwork between the top of the stone foundation and the basement floor will weigh 622 pounds. Adding all the weights together, we shall arrive at a total of 175256+18375+622=194253 pounds, or 97 tons, to be supported by 16 piles, giving a load of $6\frac{1}{16}$ tons each.

If the bottom under the piers should be found as firm as where we are now driving, the piles sinking not more than three inches, and generally less, at the last blow, with a 1600-pound hammer and 15-foot fall, we should be quite safe in adopting this arrangement, and we will stake out the piles under the piers accordingly, leaving, however, some person to watch the driving, with strict injunctions to mark on the piling-plan, of which he has a tracing, the actual sinking at the last blow of every pile, with the height of the fall; while we inspect the timber delivered on the ground, and observe the operations of cutting off the heads of the piles and laying the first course of stone, both of which are already in progress at one corner of the building.

The piles on the ground are straight spruce sticks, with the bark on, varying from 30 to 40 feet long. Here and there is visible a crooked specimen, or one the heart of which is evidently rotten, and we mark all such for rejection. The driving of the first piles has shown that the comparatively firm stratum upon which they must rest is about 31 feet below the surface, and men are engaged in cutting off the small ends of the longer piles to bring them to this dimension. It is important not to penetrate through the bearing stratum, as the ground is shown, by driving a long experimental pile, to grow soft again immediately below; all that is necessary or safe is to continue the blows of the hammer until the firmer ground is reached, which will be shown by the diminished penetration of the pile at each impact, giving then only one or two additional blows to settle it into its bed.

There is some danger that the workmen may surreptitiously endeavor to save trouble for themselves, and money for their employers, either by driving the pile only a portion of the required distance, and then cutting it off, or by putting in shorter, and therefore cheaper timbers. Either of these frauds will probably be followed, sooner or later, by serious consequences, and the only way to guard against them effectually is to witness in person, or by an intelligent deputy, the driving of every pile. We are somewhat in doubt whether it may not be necessary to send away all the 30-foot piles, of which there are several on the ground, for the reason that although they would be long enough to reach from the hard stratum to the water-line, they lack about two feet of the length necessary to extend from the hard bearing to the present bottom of the excavation where the machine stands. This, for convenience in working, is not dug down to the water-level, and there is danger that the short piles may be simply driven to the head in the ground and left there, with their feet still some distance from the stratum on which they ought to rest; but in consideration of the promise of the contractor to bring no more of the same kind, we consent to have them driven in our presence, each one, after driving to the head, being sunk farther by means of a "follower," or short piece placed on top of it, until the bearing stratum is reached. When the trenches are excavated to the water-line, which will be done as soon as the machine is out of the way, the followers will be dug out, and the piles under them will then be as useful as any.

The operation of digging out the piles is already in progress in another place. The level of the water-line, or rather, of the point at a certain distance below the average water-line where we have directed the piles to be cut off, is fixed with reference to a mark on the side of the excavation, and a steam-pump is at work to keep the trenches clear of water until the earth has been removed to a proper depth, the heads of the piles cut off at a uniform level, and the capping-stones laid. Two men, with a cross-cut saw held between them, are bending over in the mud, sawing off the top of a pile, which another man holds to prevent it from falling upon them. Observing them from a distance, we notice that in order to relieve their backs as far as possible from the fatigue of stooping, as well as to keep their knuckles out of the earth and water, they hold the saw very much bent, so that it makes a concave, instead of a level cut across the head. As we approach, the head of the pile, just severed, is purposely tumbled over their work, and the men begin another cut, this time with the saw held straight between them. Looking about the trench, we notice that one-third or more of the piles already cut off exhibit the concavity due to the bending of the saw, while others have an oblique head, and a few are cut an inch or two higher than their neighbors. Any of these defects may compromise the safety of the building, either through the crushing of the edge of a concave cutting under the weight of the superstructure, or the tilting of a capping-stone supported at one end on a pile cut obliquely or out of level; and calling the attention of the men, we point out the defective work, and direct them to recut the piles properly on the spot, waiting to see our orders obeyed.

While thus engaged we have leisure to watch the stone-laying just beyond. The adjustment of a roughly-split stone upon the heads of two piles, so that it may have no tendency to rock or move in any way under the great and varying pressure which will be placed upon it, is a difficult matter, and the work should be sharply looked after. The usual way is to place the stone in position, and then wedge up with stone or even wooden chips between it and the head of the pile, until it ceases to move when shaken; but this mode is open to many objections. Wooden chips are of course inadmissible, since they crush immediately under a strain, and stone "pinners" are liable to be broken or dislodged, leaving the block which they were intended to sustain in a condition of dangerous instability. The best, although the most troublesome method of capping, is to select only the stones with comparatively flat beds, and lay them on the heads of the piles, shifting them about, before they are detached from the derrick, until they rest immovable. They will then need no pinning or wedging, and can be depended upon to sustain without moving the load which is to be placed upon them. If wedging should be found absolutely necessary, as may sometimes happen, the stones used to pin up with should be well-shaped, strong, and securely placed upon the head of the pile, so as to be in no danger of shaking out or crumbling. With the same object of avoiding all tendency on the part of the capping-stones to rock under the load, no stone should rest upon more than three piles, unless both it and the heads of the piles have been dressed to a perfectly plane surface, and with rough stones it is not easy to get a good bearing even on three piles at once.

After explaining our ideas on these points to the foreman of the stone-layers, whose opinion coincides with our own, we return to the front wall, where the pile-driving machine has arrived before us, and are troubled to find that the ground appears softer there than under the other portions of the structure. As we approach the row of isolated piers forming the middle of the front, the piles sink under the last blow of the hammer from three to four inches, instead of two and one-half or three inches, showing that a variation has taken place in the texture of the clay stratum upon which they rest. A trial pile driven by means of a follower to a depth of 40 feet sinks at that distance more rapidly than ever, and we are forced to the conclusion that the bottom at 31 feet, although poor enough, is the best to be had. A simple calculation is, however, sufficient to show that it is unsafe to trust the weight of the piers upon it without adding to the number of piles under them, and thus diminishing the

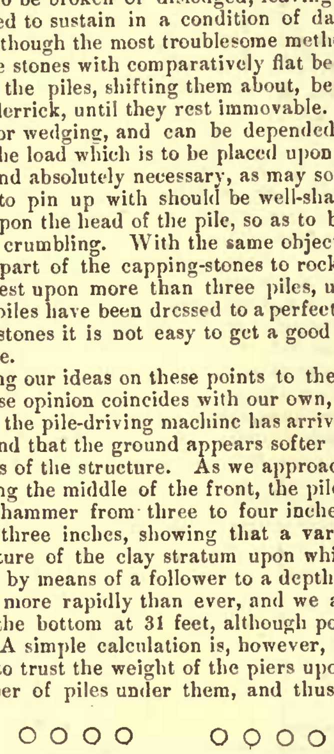


Fig. 194.

load upon each point of support. Supposing the sinking of each pile at the last blow, under the actual conditions, to be four inches, the weight which it could be relied upon to sustain safely would be $4\frac{1}{2}$ tons, and the number needed to support the load of 194253 pounds, which was previously calculated as the weight on each pier, would

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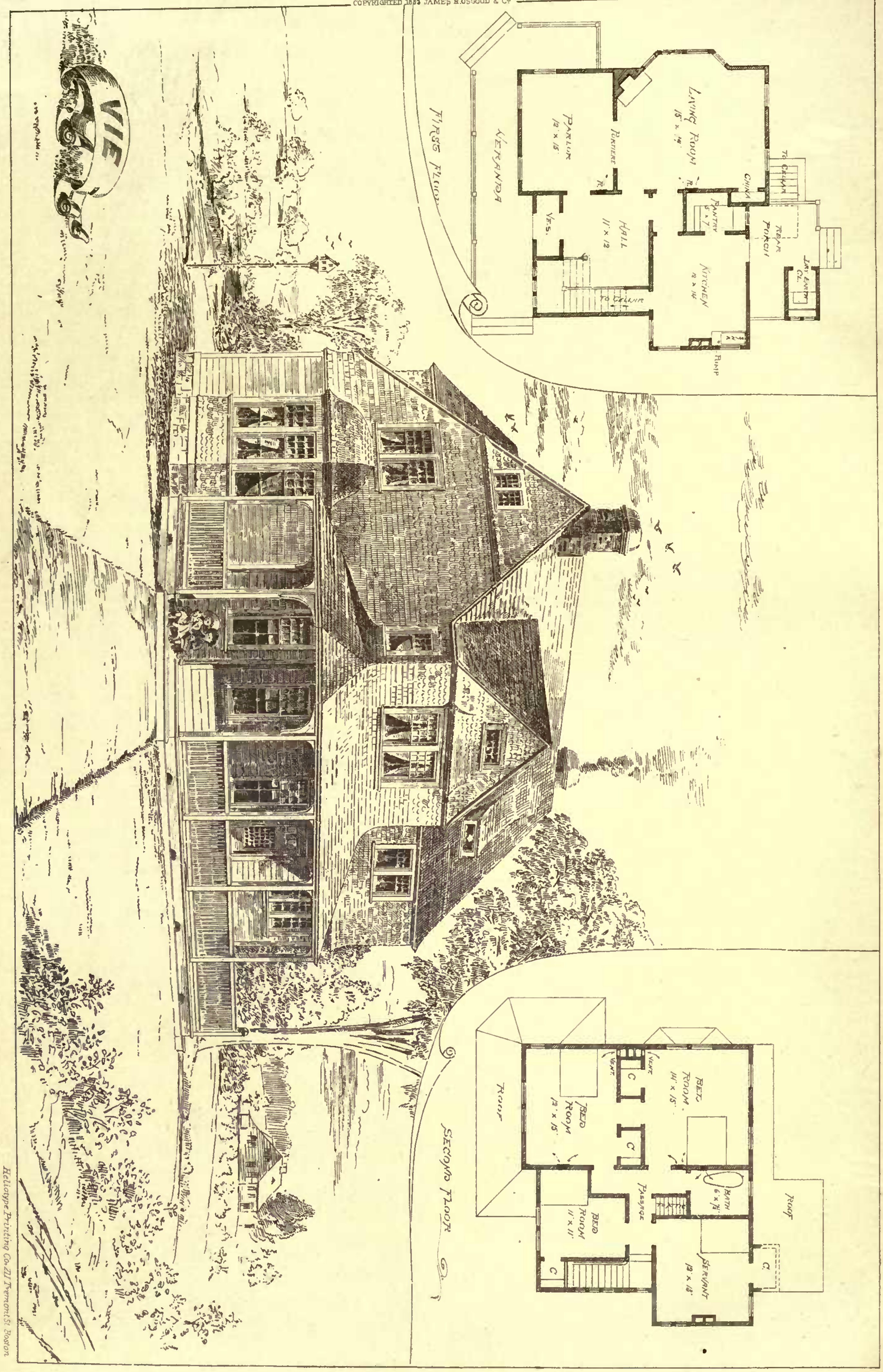

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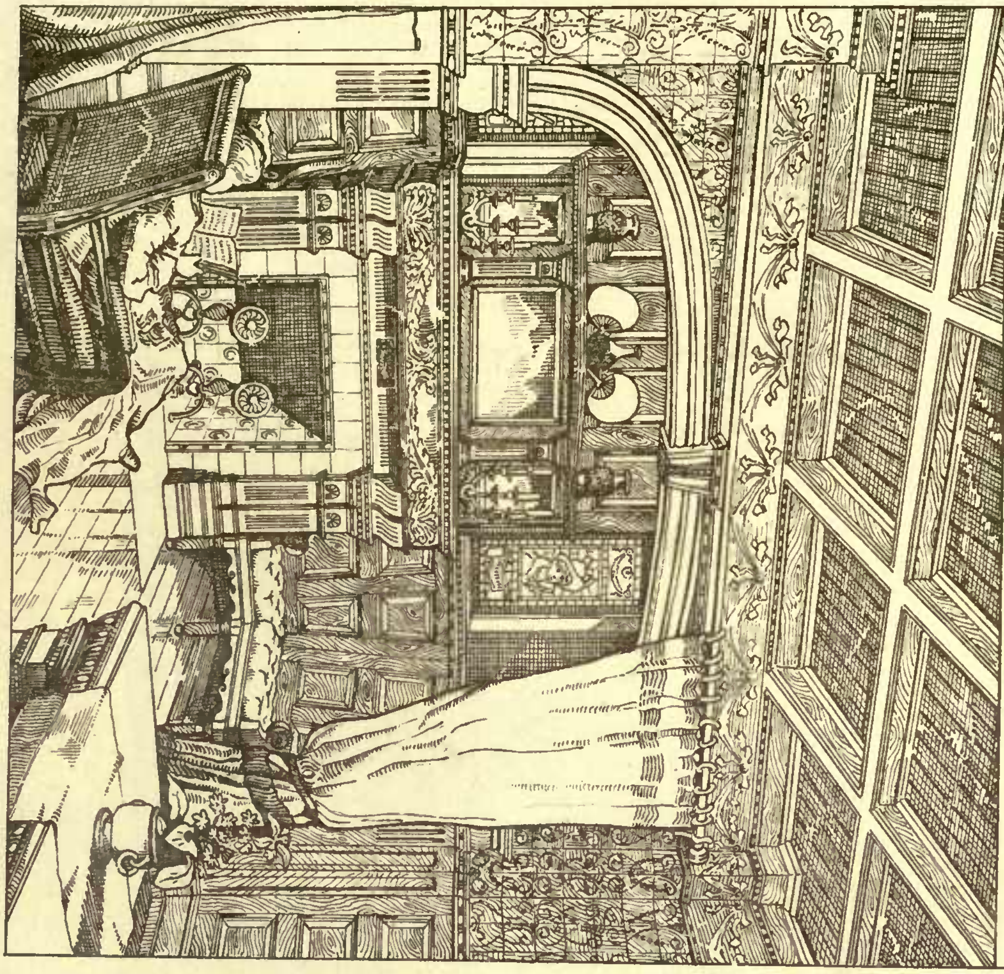

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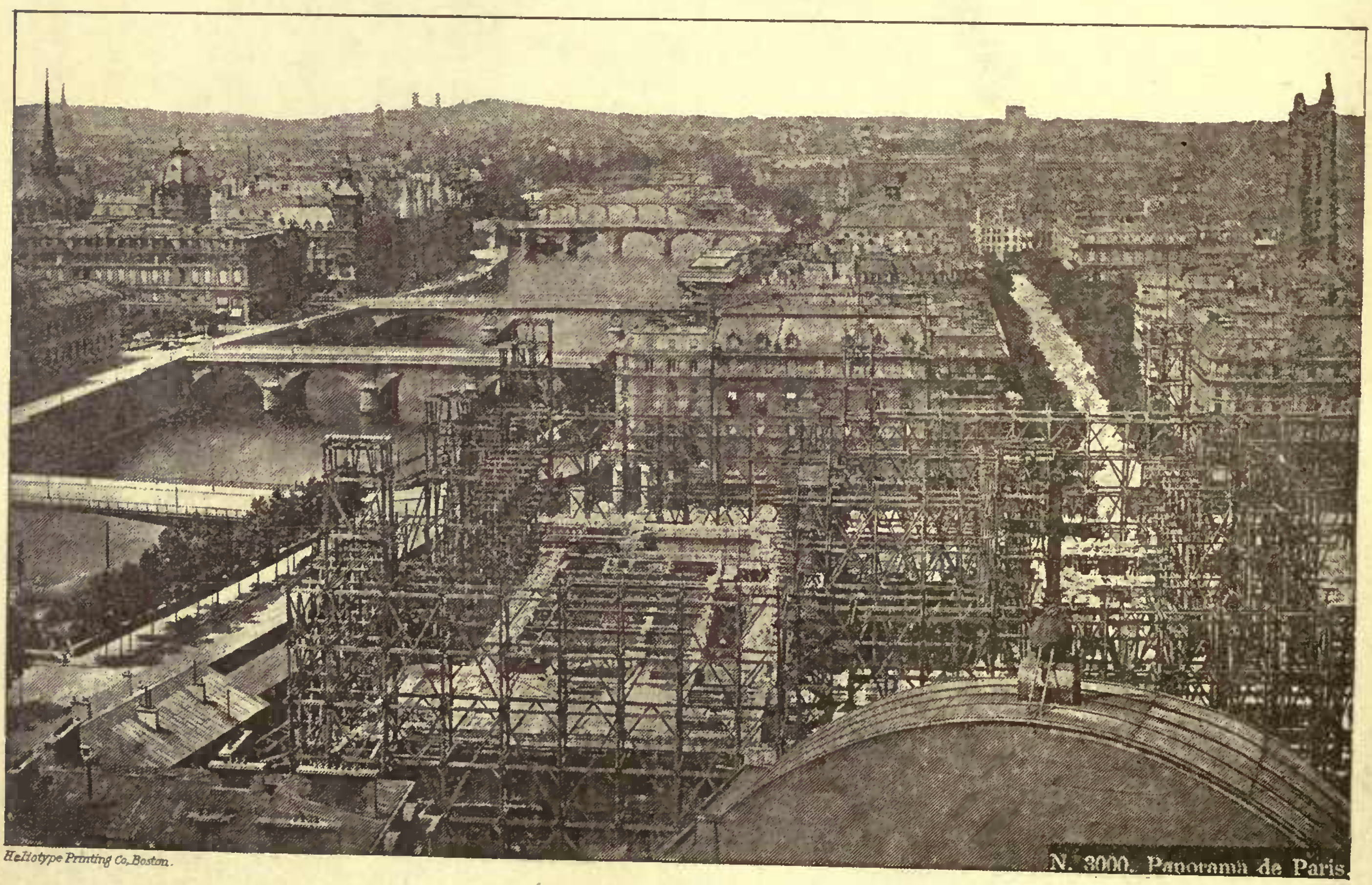
· · · Residence · for · Luther Dock · Esq · Phila ·

HAZLEHURST & HUCKEL
ARCHITECTS, PHILADELPHIA.



N. 3000. Panorama de Paris.

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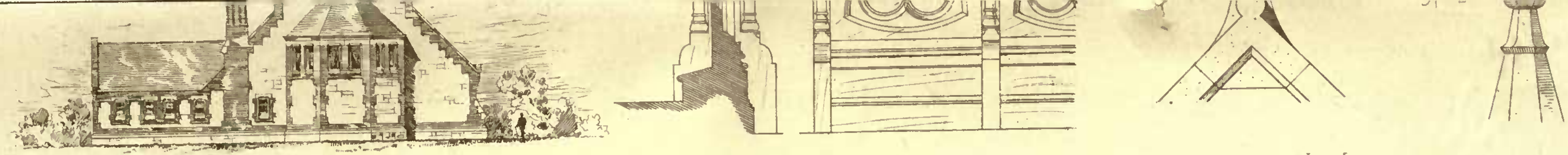
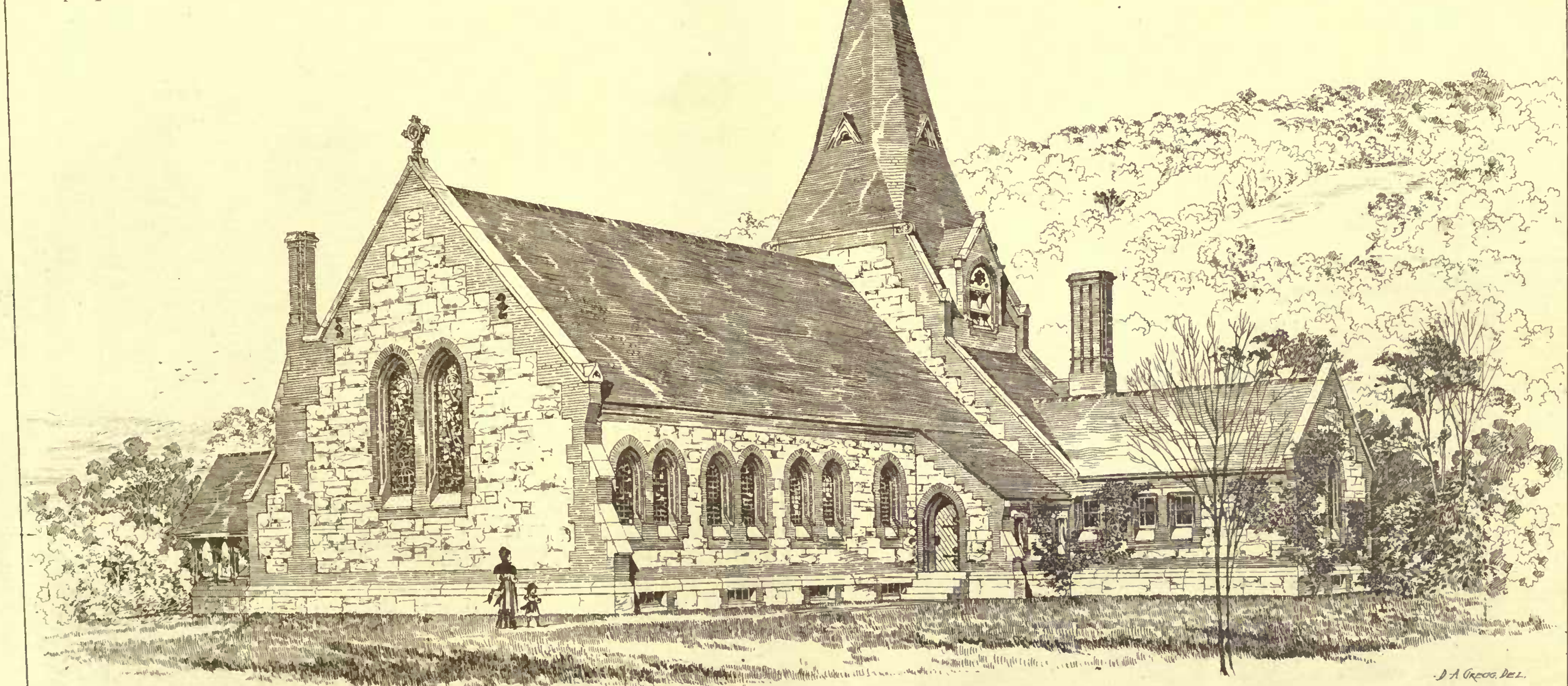


EMMANUEL CHURCH, AT SHELBURNE FALLS, MASS.

Messrs. VAN BRUNT & HOWE, Architects, BOSTON, MASS.

SOUTH WEST VIEW.



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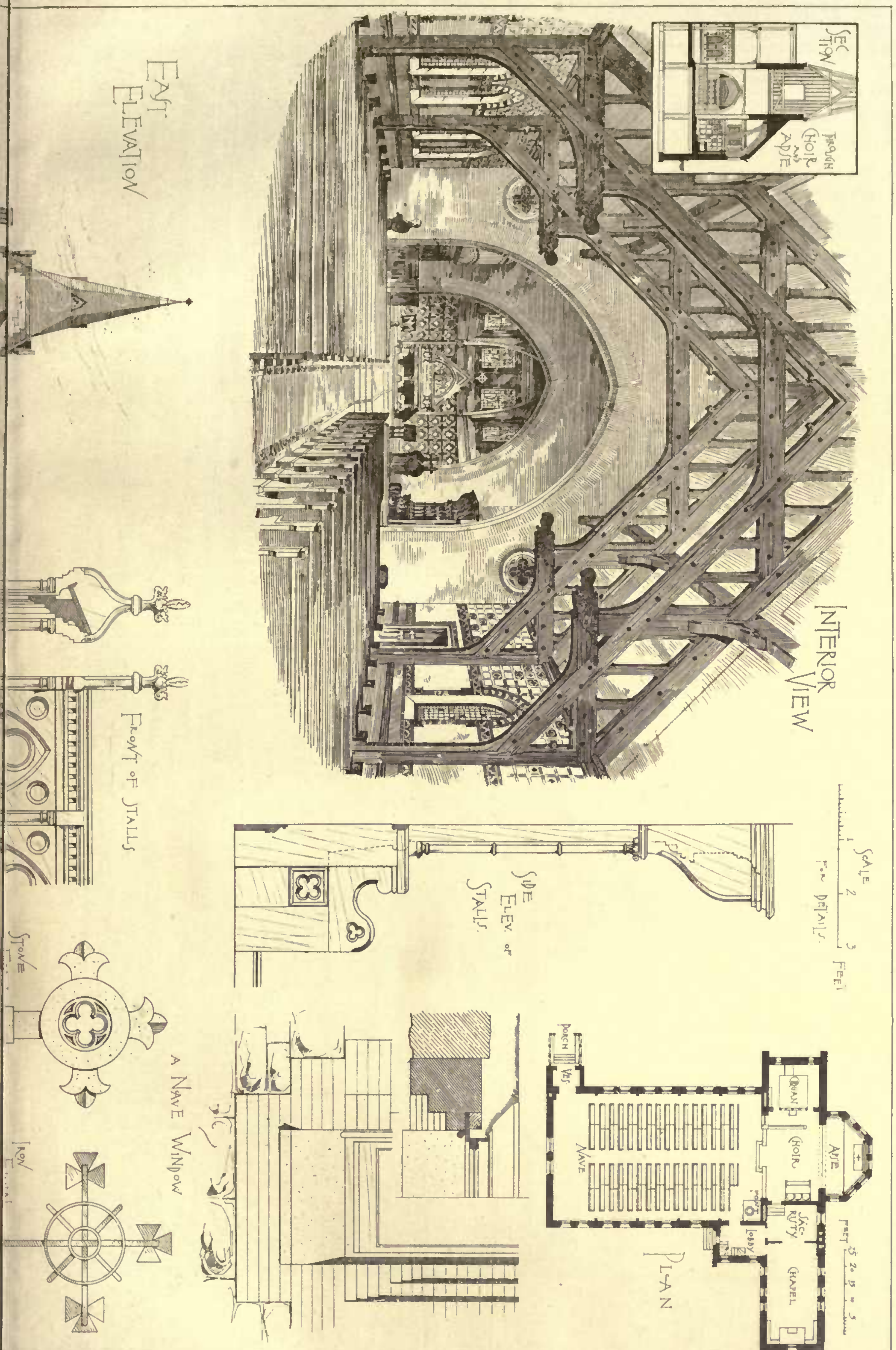
East Elevation
Interior View
Section through Choir and Apse
Front of Stalls
Side Elev. of Stalls
Scale for Details 1 2 3 Feet
A Nave Window
Stone
Iron
Plan
Nave
Choir
Apse
Organ
Sacristy
Chapel
Lobby
Porch
Ves.

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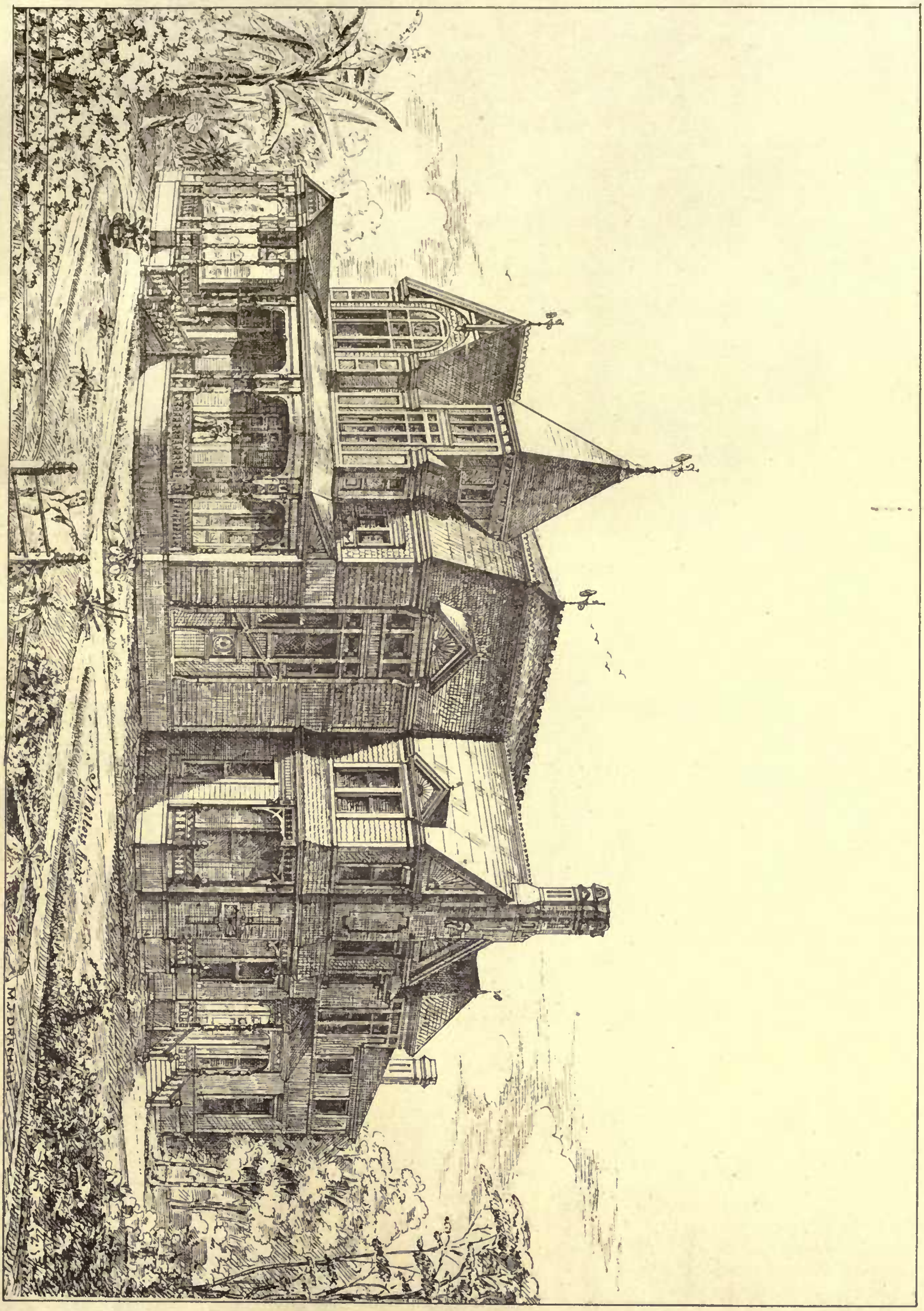

RESIDENCE OF J. HARRIS ESQ. NEW ORLEANS, LA.

H. WOLTERS, ARCHITECT. LOUISVILLE, KY.

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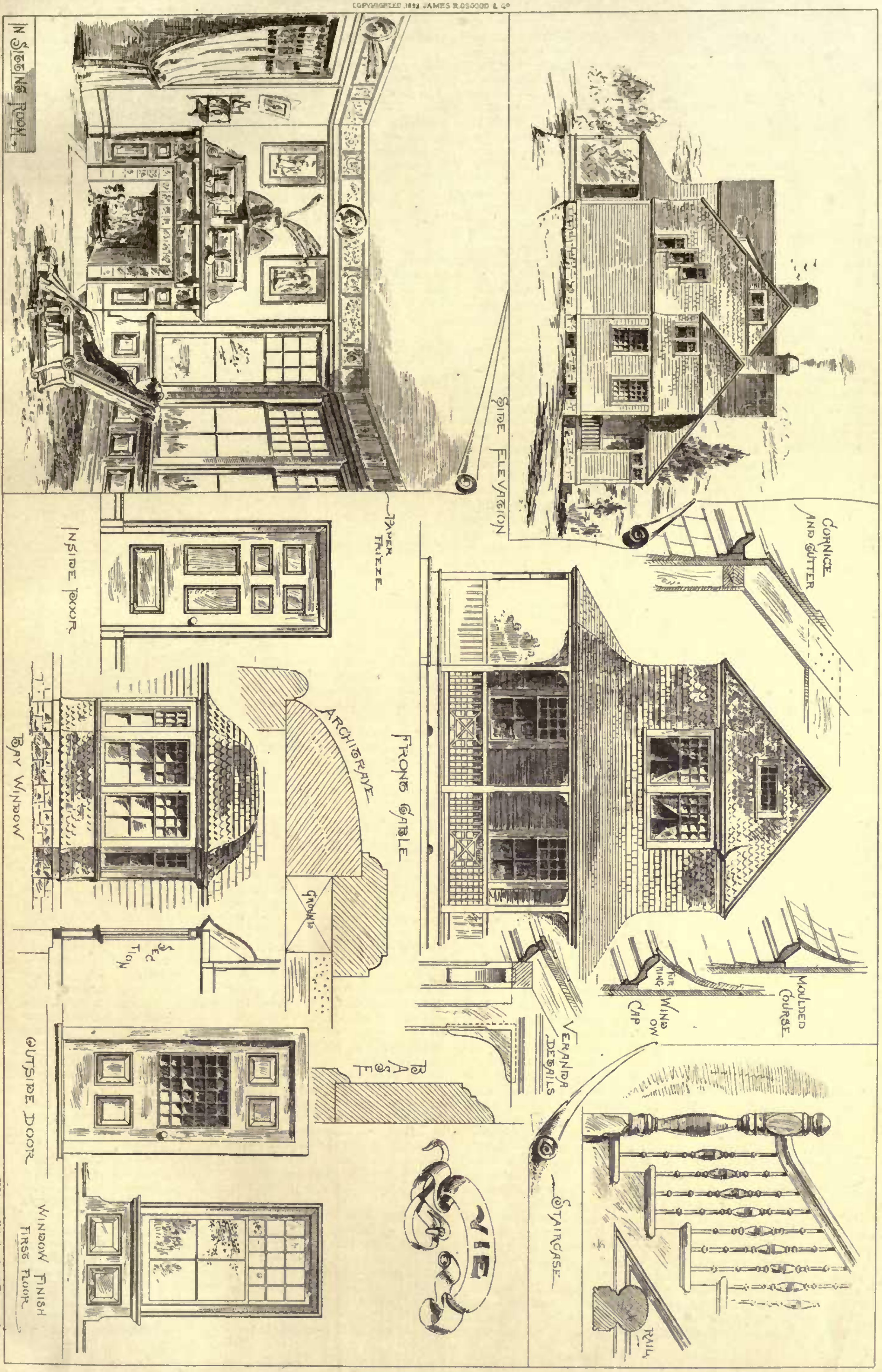

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be 22, allowing for the slight additional weight of stone required to cover the more extended base.

The ground is, however, hardly so soft as this, the average being about 3½ inches sinking at the last blow, and we shall be safe in changing our plan, and staking out 20 instead of 16 piles under each pier, as shown in Figure 194, remembering that if the ground should grow still worse it will be necessary to add to the number by driving extra rows on each side. Happily, this does not prove to be the case, and we are able, when the driving is over, to rest assured that whatever else may befall our building, the failure of the piles is not to be feared.

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR A $3,000-HOUSE SUBMITTED BY "*Vie*."

SHOULD any of our non-professional readers desire to build according to this design, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

For a criticism of this design, see the following article.

EMMANUEL CHURCH, SHELBURNE FALLS, MASS. MESSRS. VAN BRUNT & HOWE, ARCHITECTS, BOSTON, MASS.

HOUSE FOR J. HARRIS, ESQ., NEW ORLEANS, LA. MR. H. WOLTERS, ARCHITECT, LOUISVILLE, KY.

VIEW OF PARIS SHOWING THE SCAFFOLDING OF THE NEW HOTEL DE VILLE.

SEE article on "Builders' Scaffolding" elsewhere in this issue.

FIREPLACE IN THE LIBRARY OF LUTHER DOCK, ESQ., PHILADELPHIA, PA. MESSRS. HAZLEHURST & HUCKEL, ARCHITECTS, PHILADELPHIA, PA.

THE LATE AMERICAN ARCHITECT COMPETITION.

REPORT OF THE JURY.—IV.

"QUID NUNC" may live in some happy land where bricks and mortar, stone and concrete, are to be had for the asking, otherwise at the first appearance his four chimneys, and his continuous foundation-walls under all partitions, where piers would have sufficed, would make a sum total which would not allow him to build upon his generous plan. Besides his dining-room and parlor he has a library, and has permitted himself the luxury of many breaks in the outline of his house. The general plan, however, is well-disposed, the chief defect lying in a door from the kitchen opening directly into the main hall. This could have been avoided, as well as an unnecessary projecting angle in the hall, by starting the stairs differently, and letting this door to the kitchen open under the upper portion of them. Thus a lobby would have been formed to check the cooking odors. The chambers, four in number, are well arranged, but the absence of an attic sacrifices one of them to the servant. Greater experience would have shown "*Quid nunc*" that for the cost of his numerous dormers he might, with a simpler roof, have gained a fair attic chamber. While the plans show careful study and thought, the exterior and the drawings show inexperience and lack of simplicity. A multiplicity of insignificant features leaves no rest for the eye. In like manner the drawings lack firmness and breadth of handling.

"*Quoin*" suffers the penalty of not presenting an excellent design as brilliantly as several of his competitors who have substantially the same scheme. His plan is one of the most popular types—convenient and economical. The exterior, by clever drawing, might have been made more interesting, but as it is, it represents a plain, comfortable cottage, such as would commend itself readily to the average house-seeker, but with no claim to any distinction above its neighbors. In this latter requirement lay the chief difficulty of the programme. "*Quoin*" can, however, certainly claim to have presented a cottage which would find ready sale, for its expense would cover all the accommodations demanded. It may be added that the detail-sheet is unusually good.

"*Vie*" [*See Illustrations*] has much the same plan as the preceding, but with the advantage of having a vestibule, and a fireplace in the dining-room. The exterior, too, is drawn with more grace and spirit, and in design is a trifle less commonplace. "*Vie*" has kept his estimate within the $3,000, but to make the house such as it should be he should add to his items plumbing for one bath-room, which he has omitted. Whereas "*Quoin*" had the courage to insist on six per cent for the architect's commission,—none too much if the house is to be any better than its average neighbors,—"*Vie* claims only three and one-half per cent. But all considered this house could be made complete and keep within a fair limit. It may be said here that in consideration of the wording of the programme the jury have considered that the outside limit of cost should be $3,500, due allowance being made to those keeping nearest to the $3,000. "*Vie*" draws well, and has made a pretty view of the interior of the sitting-room.

"*Burns*" has a long, narrow plan—longer than is necessary, since he has a bedroom down-stairs, besides four on the floor above, and room for another in the attic. In the place of this ground-floor bedroom, opening with folding-doors into the parlor, most of his competitors with a similar plan have wisely put the dining-room, thus getting a more compact plan. The second floor is well-arranged, except the bath-room, which, coming over the large rooms below, is provided with no opportunity to have pipes properly carried down. The design of the exterior is thoughtfully treated, and leaves little opening for criticism, though a less formal and labored perspective would have shown it to better advantage. If the detail-sheet shows nothing novel, it gives no cause for offense.

"*Domus*" (No. 2) is evidently one of the most practised designers in the competition, his elevation being one of the most architectural in treatment. Note the clever way in which his gable, with its half-timbering, is combined with the large window. The rough-cast, also, is well managed. There is one serious defect, however, in the roof, which has a dangerous valley. This fault is the more to be regretted in that the plan entitles "*Domus*" to one of the first places in the competition. Both above and below economy and convenience find every requirement fulfilled. Wittingly or unwittingly, the author has adopted a device very like a fraud. On his plan a bath-room is shown, with water-closet and bath-tub drawn out; to be sure, "unfinished" is printed across it, but that is not enough to warn one that the plumbing is practically left out of the estimate, which should include the pantry-sink and a hopper water-closet shown. A perusal of the items of cost shows that $18.50 is all that has been counted upon for the generous amount of plumbing shown on the plans. The furnace might have been left for the owner to furnish, but it is more than misleading to leave out the plumbing in an architect's formal estimate of the cost of a building. The item for painting is quite inadequate, in spite of the well-known name of the painter offered as guaranty.

"*Suburban*" shows the worst of vernacular designs. An embryo carpenter could not do worse; but the vulgar details and clumsy touch have an honest sincerity about them which promises well. Let "*Suburban*" study good examples by trained designers, and let him examine patiently good drawings, and he will surely improve, for his plan shows intelligence, and all practical difficulties are well met and mastered.

No contrast to the preceding design could be greater than that which "*Qu'en*" offers us. Self-conscious and affected, full of clever conceits which are pushed into mannerisms, this competitor's remarkable facility is his stumbling-block. While nothing could be more charming than his design, if considered as the plaything of a wealthy owner, on the other hand it is utterly unsuited for our purpose, while the one or two servants of the modest establishment proposed could never give the constant care necessary to keep clean the numberless little panes indicated, and these themselves and their curving sashes and cornices are costly luxuries. Again, the charming hall, occupying two stories, is far beyond our straightened means; so is the pretty carving which is nonchalantly scattered through the design. In spite of any relief such joyous extravagance may have been to the jury after the plain, economical schemes presented, this design is evidently not a solution of the programme. The plan is clever and full of decorative points, without sacrificing comfort, but it is also ingeniously expensive. The fireplace of the hall crowds upon the door inconveniently. The drawings are brilliantly rendered.

"*As You Like It*" has a very economical plan as far as its area is concerned, but in putting his kitchen in the cellar, and making his first story of brick, his expenses in reality will push hard upon our widest limits of cost. Drawing-room and dining-room can be thrown into one spacious *suite*, giving an appearance of generous size, in spite of the careful economy shown elsewhere. The bedroom story is simply arranged, with two large and one small chamber. In the attic there is space for several rooms. The perspective shows a straightforward elevation with a gambrel, which, if not quite satisfactory, is better than most attempts to use this kind of roof. The judicious simplicity which the author shows throughout his design makes the jury especially regret that it arrived after the prescribed time, and was therefore put *hors de concours*.

Shakespeare does not bring luck, it would seem, for another competitor, "*Twelfth Night*," also comes to us marked "H. C.," as being received too late. This design is, however, by no means as good as the preceding one. The hall is too large, and its fireplace a luxury beyond our means. The parlor and dining-room, with the chambers above, are of unwarranted size; otherwise the plan is good. The same faults do not apply to the elevation, which is as economical as possible, and with some good points. The chief merit in this design, however, lies in the details, the view of the hall and stairs having very attractive features. Note the panels of the fireplaces.

Ambition has carried "*T-square*" away, but is also the chief merit of his design. In the first place, he has laid out too ambitious a scheme. Without entering into a discussion of his own or his builder's estimate, it is not probable that such a house could be built with its plumbing in the neighborhood of any city. He has a

hall much larger than is needed, and five rooms — not including bath-room — besides several attic rooms. The question of the cost of the house aside, the plan is good, and worked out with commendable care. His china-closet, however, would be such an ill-lighted affair as few housekeepers would tolerate. The exterior is as ambitious as the plan, but, though considerably broken up, is kept well massed. More pains than skill is revealed by the drawings, but we are willing to rank for future results the former quality as the most valuable.

(*To be continued.*)

THE $3,000-HOUSE COMPETITION. — X.

SPECIFICATIONS IN BRIEF SUBMITTED BY "*Vie.*"

THE house is to be located in a country village, a few miles distant from the city where the proprietor has his business. It stands upon high ground, and upon a sandy subsoil. The style of building adopted is that of the old Connecticut farm-house, both on account of surroundings, and because the extreme plainness of the exterior finish will admit of a little more generous expenditure on inside comforts. Enough money has been estimated for labor to permit a strong and thorough construction throughout, and this is demanded.

MASON WORK.

Excavation:— Mason to save top soil and to do all necessary grading about the building with same. Excavations to extend 8″ beyond the line of outside of stone wall. The stone walls for foundation to be well built in mortar of two parts cement to one of lime; to be thoroughly bonded; stones to be laid on their broadest beds; outside of wall to be as well built as inside, and to be carefully pointed. Wall to be 18″ thick.

Bricks to be good merchantable, and for piers and chimney-tops, to be laid in cement-mortar. Chimney flues to be smoothly pargetted.

Plastering:— The plastering in first story to be the best three-coat work; in second-story, two-coat work, left for papering.

CARPENTER'S WORK.

Carpenter's work to be well and thoroughly done throughout. All timber in frame and floors to be of size sufficient to give ample strength, and bracing and trussing to be used wherever necessary.

Frame:— The house to have a balloon-frame, with plate at second-story level all round. Sill, 6″ x 6″; posts, 4″ x 6″; studs, 2″ x 4″, etc.

Floors:— Floors to be of good quality 1¼″ spruce, in widths not to exceed 4′, thoroughly blind-nailed. Kitchen floor, 1¼″ yellow-pine.

Doors to be 1¼″ thick, moulded. Sash to be 1¼″ thick, glazed with small panes in upper sash.

Inside Finish: — Finish in Hall, Parlor and Sitting-room, to be 4½″ moulded, as shown; elsewhere to be 5″, with small bead. Base in best rooms, 9″ wide, in two sections; elsewhere, 8″ wide, bevelled. Finish to be put up after plastering is dry.

Stairs:— The stair-rail, balusters and newels to be of good cherry, thoroughly filled.

Hardware:— All hardware and trimmings to be plain and simple, but of good quality and strong. All lumber in veranda to be of good pine; underside of roof-boards and rafters to be planed.

Earth-Closet: —Moule's dry-earth closet to be used, and to be carefully fitted and cased with good pine.

Gutters and Conductors:— Gutters and valleys to be of M. F. charcoal tin, well soldered and painted. Conductors, I. C. tin.

Well and Pump:— House to be supplied with water by a driven well, and to have pump at Kitchen sink.

Sink:— Kitchen sink to have lead waste with S-trap, and to be drained, by 4″ tile, to a tight cesspool 6′ x 8′, removed twenty feet from house.

Painting:— House to be painted outside, and inside three coats of paint. Kitchen doors grained. Inside wood-work painted light pearl gray or drab in two shades. First story outside, a light shade of olive green; all shingle work above to roof, to be painted light red.

Mantel:— Mantel in Sitting-room of brown ash.

ESTIMATE OF QUANTITIES AND PRICES RULING AT HARTFORD, CONN.

MASON'S WORK.

225	sq. yds. excavation and grading,	@ $ .25 per yd.,	$ 56.25	
127	perch stone foundation walls,	" 3.25 " pch.,	412.75	
6635	brick, laid,	" 12.00 " M.,	79.62	
658	sq. yds., plastering,	" .30 " yd.,	197.40	
34	ft. bluestone,	" .50 " ft.,	17.00	
100	sq. yds., cementing, cellar-bottom,	" .25 " yd.,	25.00	
20	ft. drain tile,	" .25 " ft.,	5.00	
21	" 5 in. ornamental tile,	" .25 " "	5.25	
8	sq. ft. Brockadella marble hearth,	" .25 " "	2.00	
	Driven-well,		15.00	
	Total of Mason work,			$ 815.27

CARPENTER WORK.

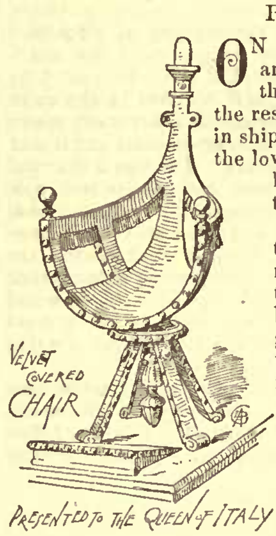
7840	ft. spruce timber,	@ $19.00 per M.,	$ 148.96	
2675	" siding,	" " " "	50.83	
1457	" roof-boards.	" " " "	27.68	
17444	shingles,	" 6.00 " "	104.66	
1098	ft. clapboards,	" 30.00 " "	32.94	
2500	" spruce flooring,	" 25.00 " "	62.50	
303	" yellow-pine flooring,	" 50.00 " "	15.00	
869	" outside finishing-lumber,	" 55.00 " "	47.80	
419	" moulding,	" .10 " ft.	41.90	
100	" furrings,	" 19.00 " M.,	1.90	
1575	" inside finishing-lumber,	" 55.00 " "	86.50	
298	" moulding,	" .01¾ " ft.,	5.21	
318	" "	" .03¼ " "	10.33	
81	" "	" .00⅞ " "	.70	
75	" "	" .02¼ " "	1.69	
	Mantel,		25.00	
29	window sashes,	" 2.75 per sash,	79.75	
7	doors,	@ $5.00 per dr.,	$35.00	
16	"	" 3.00 " "	48.00	
25	pairs hinges,	" .25 " pr.,	6.25	
500	lbs. weights,	" .01¾ " lb.,	8.75	
450	ft. rope,	" .00⅓ " ft.,	1.50	
2⅓	doz. pulleys,	" .30 " doz.,	.70	
2⅓	" locks,	" 2.00 " "	4.67	
4	" knobs,	" 3.00 " "	12.00	
14	locks and latches,	" 1.00 " lock,	14.00	
6⅙	doz. latches,	" 3.00 " doz.	3.50	
25	ft. saddles, cherry,	" 70.00 " M.,	1.75	
8	" sills, oak,	" 50.00 " "	.40	
10	" stair-rail, cherry,	" .25 " ft.,	2.50	
33	balusters, "	" .25 each,	8.25	
2	newel-posts, "	" 2.50 "	5.00	
66	ft. cellar and attic steps,	" 50.00 per M.,	3.30	
76	" "M. F." tin gutter,	" .25 " ft.,	19.00	
52	" " valleys,	" .08 " "	4.16	
98	" conductors,	" .15 " "	14.70	
40	" hot-air pipes,	" .40 " "	16.00	
7	registers,	" 3.50 each,	24.50	
	Sink,		3.00	
20	lbs. lead pipe,	" .07 per lb.,	1.40	
	Door-bell,		5.00	
8	doz. closet-hooks,	" .25 " doz.,	2.00	
600	lbs. nails,	" .05 " lb.,	30.00	
300	" sheathing-paper,	" .03 " "	9.00	
	Dry earth-closet, painted pine, including reservoir,		30.00	
672	ft. spruce-timber, } VERANDAS:	" 19.00 per M.,	12.82	
1654	" pine-lumber, } VERANDAS:	" 50.00 " "	82.70	
57	" moulding, } VERANDAS:	" .08¾ " ft.	4.55	
2400	shingles, } VERANDAS:	" 6.00 " M.,	14.40	
	Pump,		8.00	
	Total of joiner's materials,			1,180.15
	Labor and contractor's profit,			600.00
	Painting,			250,00
	Architect's charges,	" .03½ per cent.,		105.00
	Grand Total,			$2.950.42

NOTE I. — All of these estimates were received from *first-rate practical builders.*

NOTE II. — There is left a balance on hand of $19.58 for which doubtless the *mistress* of the house will find excellent use before the building is completed.

NOTE III. — The furnace is not included, but all vertical pipes and registers are put in, ready for it. "*Vie.*"

PITCH-PINE.



ON this subject there does not appear to be any direct information. Loudon tells us that the pitch-pine tree supplies nearly all the resinous matter used in the United States in shipbuilding. Formerly tar was made in all the lower parts of the Carolinas and Georgia, but at present this manufacture is confined to the lower districts of North Carolina.

The resinous products of this pine are turpentine, scrapings, spirit of turpentine, resin, tar, and pitch. Of these turpentine is the raw sap of the tree, obtained by making incisions in the trunk. It begins to distil about the middle of March, when the circulation commences, and it flows with increasing abundance as the weather becomes warmer, so that July and August are the most productive months.

The sap is collected in what are in America called "boxes." These are incisions, notches, or cavities, cut in the tree, about 3 inches or 4 inches from the ground, generally of a sufficient size to hold about three pints of sap, but proportioned to the size of the tree, the rule being that the cavity shall not exceed one-fourth of the diameter of the tree. These cavities are made in January or February, commencing with the south side, which is thought the best, and going round the tree. About the middle of March a notch is made in the tree, with two oblique gutters to conduct the sap that flows from the wood into the box or cavity below. In about a fortnight the box becomes full, and a wooden shovel is used to transfer its contents to a pail, by means of which it is conveyed to a large cask placed at a convenient distance. The edges of the wounds are chipped every week, and the boxes, after the first, generally fill in about three weeks. The sap thus produced is used as turpentine without any preparation, and is called "pure dripping." The scrapings are the crusts of resin that are formed on the sides of the wounds, and these are often mixed with the turpentine, which, in this state, is used in the manufacture of yellow soap, and is called "Boston Turpentine." Long-continued rains check the flow of the sap, and even cause the wounds to close; and for this reason very little turpentine is produced in cold, damp seasons. In five or six years the tree is abandoned, and the bark never becomes sufficiently healed to allow of the same place being wounded twice.

All the tar in the Southern States is made from the dead wood of the pitch-pine, consisting of trees prostrated by time or by the fires annually kindled in the forests, of the summits of those that are felled for timber, and of limbs broken off by the ice that sometimes overloads the trees. As soon as vegetation ceases in any part of a pine tree, its consistence changes, the sap-wood decays, and the heart-wood becomes surcharged with resinous juice to such a degree as to double its weight in a year, and this accumulation increases for several years. Dead wood is thus productive of tar for several years after it has fallen from the tree.

We find no author dealing with the question of the value of the wood of the pitch-pine tree after it has been tapped for turpentine; but it must, of necessity, be lighter, softer, and less durable in quality than in a natural state. Loudon gives us a parallel case in the larch tree, where it is most prolific, viz., in the Briançonnais and Vallais. After describing the process of tapping the larch, which is very similar to that of the pitch-pine tree, he says: "A full-grown, healthy larch, if tapped when of the proper age will yield 7 or 8 pounds of turpentine every year, for forty or fifty years. The wood of a tree from which the resin has been extracted is never used for building purposes; it is indeed only good to burn; and the charcoal made from it is very much lighter than, and very inferior in every respect to, that made from trees which have not been deprived of their resin."

In dealing with the Scotch fir, and the forests of Scotland and the north of Europe, we find numerous allusions to the tapping of trees for turpentine, but none to the quality of the wood for commercial purposes being damaged thereby. With regard to the pitch-pine and the Scotch fir, it becomes a matter of doubt whether the heart-wood is affected in its quality by this operation.

On this subject also more information is to be desired, and we should be glad to hear from some of our correspondents on the subject. We have the evidence of Loudon, in connection with the tapped wood of the larch, that wood of this class is inferior, and even unfit for building purposes; but it is questionable whether inferiority of this description would travel to the pitch-pine, for it is a fact that we hear nothing of an inferior or "tapped" quality of wood in the trade. We have, it is true, a kind and soft class of wood shipped from Savannah, and a strong, hard quality from Pensacola and Darien: these we take to be the result of different soil and locality and not of tapping for turpentine. We have again the fact that this tapping operation is carried on in connection with the Scotch fir (*P. sylvestris*) in the forests of Northern Europe, and of absolute silence in regard to deterioration in the quality of the wood. We never hear of an inferior or tapped class of redwood in the trade, which, to say the least, is somewhat remarkable; for, next to the pitch-pine tree, it is the one most drawn upon for resinous products.

There is considerable evidence that the tapping of pitch-pine trees interferes but little with the nature or quality of the heart-wood. It aims at the fluid sap, or the essential oils, which are soluble in water, and volatile in character, and confined to the outer zones of the tree. It has but little bearing on the heart-wood, where the secretionary matter has become resinous, crystalline, and insoluble, and can only be extracted by heat or fire. The one is the vital or active fluid of the tree, the other the dead and passive secretion, unamenable to the tapping or bleeding influence. We take it that a mature tree, upon being tapped, would undergo little or no change in its heart-wood, the influence at work being a weakening of the vegetable action, not an extermination, the result being a diminished amount of foliage and a contracted annular ring of wood. It would incline the tree to carry a less amount of sap-wood, and to a more rapid formation of duramen, or heart-wood, although the latter might not be so strongly impregnated with resinous matter.

We hope to receive further correspondence on this interesting point; but we are strongly of opinion that the tapping influence is so slight upon the wood as a marketable commodity, that the difference between one and the other is imperceptible. — *Timber Trades Journal.*

AN EXTRAORDINARY BUILDING.

DETAILS OF EAST GATEWAY OF TEMPLE, NISHI HONGWAN-JI, KIOTO.

THE narrowest house in New York may be seen at the northwest corner of Lexington Avenue and Eighty-second Street. When Lexington Avenue was cut through some years ago, a strip of land five feet wide and one hundred feet deep was all that was left of a certain lot belonging to a person who did not own the next lot on the street. The strip, while of little value by itself, would be valuable to the person owning the adjoining lot on Eighty-second Street, because it would not only enable him to build a house five feet wider, but would give him windows all along the side of his house on Lexington Avenue. The two owners, however, could not agree as to terms, and a house was erected on the lot adjoining the narrow strip. The owner of the latter had nothing to do but to abandon his lot or build a house five feet wide upon it. The latter course was perhaps adopted because such a house would shut up all the side windows of the neighboring building, and considerably reduce its value.

The new building, which has been finished for some months, is therefore 5 feet wide, 100 feet deep, and 4 stories high. It is divided into two houses, each fifty feet long, and the entrance doors are, of course, on the Avenue, as there is no room for a door at either end of the building. The law allows a building at the corner of a street to have projecting bay-windows along the side, and taking advantage of this circumstance, the architect has managed to plan a house which, while peculiar in inside appearance, and probably very uncomfortable to live in, may find tenants. Without these bay-windows or square projections running from the foundations to the roof it would not have been possible to build a house at all, for no room would have been wider than three feet. Each house has, therefore, two bay-windows, in one of which are the stairs and in the other one room about eight feet wide by fifteen feet long, upon each floor. The long passage between the stair-well and the room is about three feet wide. Each house contains a kitchen 8′ x 15′, and four rooms, each of the same size, but on different floors. There are also ingeniously-placed closets at each end of the building and under the stairs. Both houses are unoccupied. One is offered for rent at $500 a year.

If the object of the builder of these extraordinary houses was simply to shut out the light from his neighbor's building, he would probably have accomplished the same end at much less expense by adopting Mr. George Kemp's device of sheet-iron shields. Mr. Kemp did not wish the occupants of the building in the rear of his house, at No. 720 Fifth Avenue, to overlook his premises, and so he built an iron scaffolding in his back yard and placed iron shields against the obnoxious openings, shutting out air and light as completely as a brick wall would have done. This arrangement has been for years the source of no little comment from the neighbors and passers-by. — *New York Evening Post.*

MONTHLY CHRONICLE.

MARCH 16. Burning of the theatre at Lima, Peru.

April 1. The old Opera-House at Augusta, Ga., is burned, early in the morning.

Burning of the National Theatre, Berlin, Germany, in the afternoon.

April 6. The front walls of two old houses on Mary Street, Philadelphia, fall out. No one hurt.

April 8. The Eade Hotel at Greenville, Tex., falls. Fourteen persons killed or burned, and others injured.

Burning of the Logan House, Murphysborough, Ill. One man burned to death.

A hurricane passes over the country south of Hot Springs, Ark. Several lives lost.

April 10. Fall of J. F. Carter's building on State Street, Rochester, N. Y., in course of construction, caused by laying bricks in freezing weather. Two men killed and several injured.

Burning of the Ansonia Hotel, Ansonia, Conn.

April 11. One thousand buildings at Mandalay, Burmah, are burned.

April 12. Tornado passes over Milan, O. Several persons killed and injured.

Gas-explosion in the Theatre at Revel, France, causes a panic during which many are killed and injured.

April 14. A tornado passes over White Oak Station, Ark., doing damage to life and property.

April 15. Burning of the Opera-House at Union City, Pa.

Collapse of a grain-elevator at Winnipeg, Manitoba.

Burning of the Atlantic House, Albia, Io. Three persons burned to death.

April 16. A portion of the walls of the Galliger Building near Main Street, Rochester, N. Y., fall at midnight. Also a dwelling in course of construction in another part of the city. No one hurt.

April 19. Fall of two floors of the Lithgow M'f'g. Co.'s foundry, Louisville, Ky., caused by overloading. No one hurt.

Part of a building in course of construction on Twenty-fifth and Nicholas Streets, Philadelphia, falls. Three men injured.

Burning of the old Parliament Building at Quebec, Canada.

April 20. Two thousand houses are burned at Delhi, India.

April 21. Tornado passes through Dunlap, Io. Some lives lost.

April 22. A terrible cyclone passes through Louisiana, Mississippi, Alabama, Georgia, North and South Carolina, doing immense damage to life and property. Beauregard, Miss., totally destroyed; killed, thirty; seriously injured, fifty-nine; at Wesson, Miss., killed, twenty-one; injured, fifty; at Rockport, Miss., killed, ten; at Hohenlinden, Miss., killed, thirty; at Pine Bluffs, Miss., seventeen killed; at Aberdeen, Miss., three killed, twenty-five injured; at Albany, Ga., eight killed, twenty-five injured, and loss of life at other places in the track of the storm.

April 25. Destructive water-spout near Lenoir, N. C.

April 26. Arch-Street Opera-House, Philadelphia, is burned in the morning.

HYDRAULIC BRICK-MACHINES.

411 OLIVE ST., ST. LOUIS, MO.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In answer to query on page 190, I would say that our machines are in operation at Cleveland, O., Memphis, Tenn., and Louisville, Ky. The "Ethan Rogers Press" is the only hydraulic brick-machine in the country and is owned and controlled by this company. Yours, HYDRAULIC PRESS BRICK CO.

BRICK HOUSES.

HENDERSON, KY., April 24, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Can you give me the name and price of a good work on domestic architecture, one, for example, giving plans and specifications for houses in brick of about $6,000 first cost.

Yours truly, O. F. N.

[PERHAPS "Wooden and Brick Buildings" published in two volumes by W. T. Comstock, 6 Astor Place, New York, will serve your purpose. Price $12.00. — EDS. AMERICAN ARCHITECT.]

A VALUABLE BUILDING STONE. — The discovery of building stone at Albany, Oregon, upon which the action of neither heat, cold nor moisture has any bad effect, is one of the most important events that has ever occured in the State. The stone is called granite sandstone, very rich in silica, of a close, fine grain, highly crystallized, unlaminated, and of a fine brown color. It has been used in this locality for many years, for fireplaces, door and window sills and for monumental work. It has lately been put to some very severe tests with a view to using it for the building of the great union depot at Portland. It was brought to a white heat, and suddenly plunged into cold water, and came out as solid and firm as before it went into the furnace. — *Wood and Iron.*

NOTES AND CLIPPINGS.

Cremation in Japan. — The cause of cremation is making progress in Japan that may well startle as well as encourage the advocates of cremation in Western lands. It is said that the number of bodies disposed of in that way is about 9,000 a year. The furnace is a stone and cement structure, with a tall chimney that makes it look like a factory. In the vestibule are a number of red earthenware urns and small shovels which the relatives of the deceased purchase to collect the ashes after burning. Besides the vestibule there are four chambers, the largest of which is decorated with granite columns. After the cremation the ashes are collected, placed in an urn, and then buried—often with much pomp—in a cemetery. The building is hedged in by fences of bamboo-canes and red camellias. — *New York Times.*

A Slickens-Ruined Farmer. — Less than a mile above the city (Sacramento) the American River empties into the Sacramento, and immediately beyond that point the scene becomes interesting. One picture we had on the point made by the junction of the rivers was characteristic of the country. On the bank near the extreme end of the point, in leather-colored clothing, a ragged slouch hat, gray-haired and gray-bearded, supporting himself on a heavy stick, distinctly outlined against a gray sky, stood a slickens-ruined farmer. He stood on a bank of slickens, part of many acres of slickens-topped land now growing only dense forests of young cottonwood, all gray-green, where once ripening grain and fruit repaid his toil. Unlike most of his kind, he had not deserted his acres when they became worthless. Too old to attempt a fresh start in life, too bankrupt to afford to even desert the bare subsistence he could force from one or two feebly-living acres on the old place, too discouraged to hope, too crushed to even complain, he remained, growing withered and useless and gray with the land beneath him. As we rowed past he stood there motionless, perfectly in accord with every other element of the picture — all sombre, all sad. — *San Francisco Call.*

Measures against Scaffold Accidents. — New and special instructions have just been issued by the Paris Prefect of Police, so as to reduce the too frequent occurrence of accidents in the building of houses, etc. The local chiefs of the police are ordered to visit every scaffold in their district before work is begun. Suspended scaffolding is to be maintained by three, instead of only one rope, and cloths must be so arranged as to prevent dust or fragments from falling into the street. In the event of any workman or pedestrian being wounded, the building contractors are to be at once prosecuted before the police or correctional tribunals. Since Zola depicted the fall of Coupeau from the house-top, and since the reproduction of this scene of *L'assommoir* on the stage, the public have manifested special concern respecting accidents of this nature. It has even been suggested that masons should be protected in the same manner as acrobats, who perform on the trapèze. A net, it is urged, must be placed round buildings in course of construction to catch the stray workmen who chance to fall off the scaffold! Such extreme solicitude may seem somewhat eccentric and exaggerated; but, among our neighbors, there is a serious question of rendering this precaution compulsory. — *The Builder.*

The King of Bavaria's New Palace. — King Louis II of Bavaria has recently returned to Munich, after having passed the last four months at his new country seat, Neuschwanenstein (New Swan's Stone). This is the newest and most magnificent of his numerous castles, and in point of size may be ranked with the most celebrated palaces on the Continent. Neuschwanenstein stands on the isolated Tegel-rock, opposite to the well-known Hohenschwangau, and two drawbridges connect it with the carriage roads on either side. The castle has a height of six stories, with rich decorative architecture in pure Italian style, and numerous balconies and corner-turrets, all in solid granite. In the middle a great watch-tower rises to 360 feet in height, with two verandas near the top, from which a grand view of the Bavarian Highlands may be enjoyed. The roof of the palace is covered with copper, crossed diagonally by gilded plates. An enormous court leads to the majestic portal, which is a marvel of the stone-cutter's art. The front of the right wing of the castle is decorated with two fresco-paintings, forty feet high, one of which represents St. George fighting the dragon, and the other the Virgin Mary with the Child, as the protectress of Bavaria. The pediment of this wing bears a bronze herald in ancient armor, holding the Bavarian standard, while the left side is protected by a bronze Bavarian lion. The interior of this royal residence is highly decorated by innumerable statues and double columns in the style of a Gênoese palace, and the splendor of the state rooms can hardly be described. The ceilings are overloaded with decorative stucco-work, while the walls are embellished with fresco-paintings by the first Munich artists. The subjects of these paintings are taken from the history of the Bavarian Kings from 1806 to 1867, from episodes of the Franco-German war of 1870-71, in which Bavarian troops took part, and also from the last music-dramas of Richard Wagner, the "Ring of the Nibelung" and "Parsifal." The floors of the halls are either of mosaic work or of various woods in harmonious patterns. The King's apartments are on the sixth story, which, besides his study, private library, and bedchamber, only include an audience-chamber for receiving the Ministerial reports. The royal study is decorated with the marble bust of the King's parent, of Richard Wagner, Gen. von der Tann, Herr von Lutz, and Augustus Heigl, the royal private secretary, besides a painting representing a scene from Wagner's "Rhinegold." It was in this chamber that King Louis received the news of the sudden death of his friend Wagner three weeks ago. The fourth and fifth stories contain the large halls, destined for the extensive library, and the collections of arms and coins. The ground floor includes a grand staircase with gold decorations. The entire castle is illuminated by electrical lamps — Jablochkoff candles in the courts, and Swan and Edison lamps in the interior. Even the royal stables are decorated with fresco-paintings, which represent prehistoric scenes. — *Berlin Letter to the London Daily News.*

Draughtswomen in England.—The system of employing draughtswomen in the drawing-office, which has been successfully introduced in several large establishments on the Clyde and in one or two other places, has now been adopted in the extensive engineering works of Messrs. Clarke, Chapman & Gurney at Gateshead. Some twelve months ago this firm determined to make the experiment and went to the expense of erecting a special building, so as to give the ladies accommodation quite separate and apart from that of the ordinary draughtsmen. The new office is roomy, well ventilated and decorated with flowers during the summer months, and is approached by a door so placed that the draughtswomen need never meet or even see the other employees of the firm. Up to the present time five ladies have had occupation, chiefly in tracing plans of steam winches, boilers, etc., for the shops, and in finishing off drawings of machinery prepared by the draughtsmen. The office hours are from 8.45 to 11.45 in the morning, and from 1.15 to 4.45 in the afternoon. So satisfied have the firm been with the result of the experiment that they are now making arrangements for the introduction of lady clerks in the execution of the ordinary commercial work of the office, and as soon as the necessary structural alterations to the buildings have been made some fifteen extra hands will be taken on. All the clerks will be required to have a knowledge of shorthand, for, in addition to their usual book-keeping, their duties will consist in writing business letters from dictation and in taking down messages from the telephone. No difficulty was found in obtaining a good number of candidates for the situations, and though the pay was at first small, so apt have the ladies been in acquiring a knowledge of their business that most of them are now earning fairly good salaries. Messrs. Swan & Hunter, ship-builders on the Tyne, are also making arrangements for the employment of female clerks. — *London Engineer.*

Houses for Artisans in Paris.— High rents have long been the grievance of Parisian artisans and the Prefect of the Seine, recognizing the justice of the complaint, has turned his attention to the matter with a view of finding a remedy for the evil. A committee has been appointed to study the question and pronounce upon the respective merits of the different solutions proposed for it. A project drawn up by M. Lalanne appears likely to be taken into serious consideration. He suggests that the city of Paris should borrow a sum of 16,000,000*f.* from the Crédit Foncier at four per cent interest. This sum would be laid out in the purchase of eight plots of ground situated within the fortifications, but outside the exterior boulevards, and in the building of eight large houses or *cités* for working men, each plot of ground and each house to cost 1,000,000*f.* respectively. The rent of lodgings in these blocks or buildings would be fixed at 120*f.* per year at the minimum and 350*f.* at the maximum. In order to facilitate communication with the place of employment a line of tramways will be opened, by means of which for 5 sous, artisans could be conveyed to the centre of Paris in the morning and taken home in the evening. The workingmen's buildings would as a matter of course, be provided with all the appliances conducive to health and cleanliness, and instead of their living, as at present, huddled up with their families in a wretched attic, lacking both light and air, they would be relatively roomily lodged at a lower rent than they pay in the city streets. The advantages to the working classes would certainly be great were this or any similar project carried out, and the sooner it is done the better for those on whose behalf the Prefect of the Seine is bestirring himself.— *London Standard.*

Straw Lumber. — The other day we had occasion to investigate pretty thoroughly the character, properties and uses for straw lumber. As some of our readers know, this is an article manufactured at the West, and turned out in boards or sheets 33 inches in width by 12 feet in length, and of various thicknesses. It is heavier than black-walnut, has no grain, is of the color of straw-board, though considerably darker, and is much stronger and stiffer than ordinary timber. Though made in considerable quantities at the present time, the supply seems hardly equal to the demand. There are advantages in this material which in the near future will probably make it of the highest value, not only for carpenters and architects, but for the car-builder, and, in fact, for mechanics generally. Its toughness, the firmness with which it holds nails and screws, the ease with which it can be cut, and the fact that it can be bent by the aid of heat, shaped in dies, and is not liable to shrink or warp, and is little affected by water, even when unprotected, makes the range of its probable uses extraordinarily great. It seems to be a non-conductor of heat and electricity. It can be rolled up into pipes of great strength and light weight, and is available for a range of uses for panelling purposes for which we have no equivalent. — *The Iron Age.*

Roofing-Linen. — According to the *Deutsche Bauzeitung*, a new covering material called "roofing-linen" has been introduced, which is about half the thickness of good *carton-pierre*, and consists of a layer of coarse linen which lies between two layers of thin roll-paper. The cohesion of the three layers is effected by an asphalte composition of special make, called "roofing-paint." It is stated that this paint should be freely applied to roofs immediately after their completion, and again about six weeks afterwards. This operation should, it would seem, be repeated every few years. The linen costs about 10*d.* to 11*d.* per square yard, and the paint 10s. to 11*s.* per cwt. Although this new method appears to have points which deserve commendation, a real estimate of its value cannot be formed until the material has been exposed to the test of several years' use.

The Capitol at Albany, N. Y. — Messrs. Eidlitz & Richardson, architects of the new capitol, report the amount required for the completion of the building according to their plans, $4,730,944. Among the items are $570,000 for the grand staircases, $20,000 for stained glass, $120,000 for bas-reliefs, $800,000 for porches, $75,000 for carving, $720,-000 for the main tower and $1,200,000 for the terrace. The amount expended up to January 1, 1883, according to Gov. Cleveland's message, was $14,222,993.09. The total cost of the structure, if estimates are accurate, will be $18,953,937.09.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents herementioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

276,217. SEWER-GAS TRAP. — Ambrose Blatchly, San Francisco, Cal.

276,219. WINDOW-FRAME. — William Bolsen, Luzerne, Iowa.

276,228. BRICK-MACHINE. — Israel Cullen, Pittsburgh, Pa.

276,241. PORTABLE HANGING SCAFFOLD. — John H. Hanavan, San Francisco, Cal.

276,247. MALLET. — Solon G. Howe, Detroit, Mich.

276,255. DOOR-LATCH. — Philip Mathes, Idlewood, Pa.

276,261. URINAL. — James McGinley, Chicago, Ill.

276,293. LIME-WASH FOR COATING BUILDINGS, ETC. — Joel H. Sharpless, Kennett Square, Pa.

276,325. SLIDING DOOR-PULL. — William H. Andrews, New Haven, Conn.

276,332. ELEVATOR. — Cyrus W. Baldwin, Chicago, Ill.

276,333. DOOR-LATCH. — Judson A. Baldwin, Shelburne, Vt.

276,342. DOOR-LATCH. — Samuel W. Billingsley, Woodberry, Md.

276,357. DEODORIZING AND DISINFECTING WATER-CLOSETS, ETC. — Edward Z. Collings, Camden, N. J.

276,363. FIRE-ESCAPE. — David Crowley, Washington, D. C.

276,386. FUME-ARRESTER FOR CHIMNEY-FLUES. — Max Freudenberg, Ems, Germany.

276,396. ELEVATOR. — William F. Hall and Philip G. Hubert, New York, N. Y.

276,409. SASH-HOLDER. — Numon N. Horton, Kansas City, Mo.

276,412. SHINGLE-MACHINE. — Pleasant R. Houpe, Oak Forest, N. C.

276,416. WINDOW-SASH. — Benj. Hurtubes, Rahway, N. J.

276,423. CHIMNEY-PROTECTOR. — John G. Keller, Monticello, Ill.

276,436. FLOAT FOR WATER-CLOSET VALVES. — Henry S. Lord and Robert E. Day, Hartford, Conn.

276,468. FIRE-ESCAPE. — Wesley Rees, Memphis, Mo.

276,470. DISINFECTING APPARATUS FOR WATER-CLOSETS. — Charles S. Rice, Jr., Chicago, Ill.

276,476. BORING AND TENONING MACHINE. — William H. Ryan, Belton, Tex.

276,481. WATER-ELEVATOR. — William M. Scott, Lockport, N. Y.

276,491. ELEVATOR. — Chas. Lievens Soyez, Brussels, Belgium.

276,499. METHOD OF TREATING LUMBER. — Ephraim J. Story, Washington, D. C.

276,507. LOCKING-LATCH. — George H. Van Winkle, Hornellsville, N. Y.

276,509. SASH-WEIGHT. — Reuben Vosburgh, Oregon, Ill.

276,511. SPIKE. — Abram Wakeman, Jr., New York, N. Y.

276,540. HINGE. — Thos. L. Rivers, Mount Vernon, Ill.

276,541. WIRE NAIL. — William D. Sloan, Brooklyn, N. Y.

276,544. BRICK AND TILE MACHINE. — Garrett Van Winkle, Avon, Ill.

SUMMARY OF THE WEEK.

Baltimore.

DWELLINGS. — A. L. Gorter, Esq., is about to have built 9 four-st'y houses, cor. Maryland Ave. and Preston St., brick, stone and terra-cotta, 16′ 8″ x 58′ 2″, from designs by Chas. E. Cassell, architect; Wm. McMullen, builder.

APARTMENT-HOUSE. — The same architect has prepared plans for the erection of a four-st'y store and apartment-house, cor. Charles St. and Boundary Ave., brick and stone, 25′ x 85′, and to cost $19,000; Geo. A. Blake, builder.

Mr. Chas. L. Carson, architect, has prepared drawings for the erection of the following buildings: —

BANK-BUILDING. — Commercial & Farmers' Bank, cor. Howard and German Sts., two-st'y brick, with stone trimmings, 38′ x 75′; cost, $25,000; Wm. Ferguson & Bro., builders.

STORE. — Three-st'y store, for Jos. H. Rieman, Esq., Eutaw St., near Lexington St., brick, with stone finish. 19′ x 74′; cost, $10,000; Wm. Ferguson & Bro., builders.

WAREHOUSE. — Five-st'y warehouse, for Wm. F. Primrose, Esq., Clay St., near Howard St., brick, with stone trimmings, 38′ x 65′; cost, $10,000; Wm. Ferguson & Bro., builders.

BUILDING PERMITS. — Since our last report twenty-four permits have been granted, the more important of which are the following: —

Geo. Kahl, two-st'y brick building, w s Sharp St., between Stockholm and Ostend Sts.

Christian W. Keidel, 6 two-st'y brick buildings, w s Charles St., between Fort Ave. and Randall St.

John M. Getz, 5 three-st'y brick buildings, n e cor. Chase St. and Getz Ave.

John Codori, 2 three-st'y brick buildings, e s Greenmount Ave., between Madison and Eager Sts.

D. H. Rice, three-st'y brick building, with stable, and stable in rear, adjoining, s s Mechanics' Court, between Hillen and Gay Sts.

Emil Wagner, three-st'y brick building, e s Harrison St., between Fayette and Gay Sts.

W. W. Lindsey, three-st'y brick building and two-st'y brick stable in rear, s w cor. Gilmor and Franklin Sts.

J. H. Carter, 3 three-st'y brick buildings, n s Lafayette Ave., w of Carey St.

People's Bank, four-st'y brick building, with basement, s w cor. Sharp and Lombard Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Circuit St.*, *No.* 54, for J. J. Williams, parochial residence, 27′ and 42′ x 62′, two-st'y mansard.

Marlborough St., *No.* 253, Ward 11, for James F. Curtis, dwell., 28′ 10″ x 65′, four-st'y flat; James Smith, builder.

Tremont St., *No.* 441, cor. Appleton St., Ward 16, for G. T. Bailey, stable, offices, etc., 17′ and 42′ x 30′, three-st'y flat; Weston & Shepard, builders.

Richmond St., *No.* 95, rear of Langdon Pl., Ward 6, for Daniel Goodnow, stable, 54′ and 92′ x 97′ 3″ and 136′, two-st'y flat; John Kelley, builder.

Wood. — *H St.*, *No.* 100, Ward 14, for Jacob P. Powers, dwell., 24′ x 34′, two-st'y mansard; Jacob P. Powers, builder.

Sheldon St., cor. Ashland St., Ward 23, for Geo. B. Litchfield, dwell., 29′ and 27′ x 30′ and 17′ x 19′, two-st'y pitch; Alexander Rogers, builder.

Shirley St., *No.* 38, Ward 26, for Wm. Donaldson, dwell., 20′ and 22′ x 28′, and 14′ x 16′, two-st'y pitch; Wm. Donaldson, builder.

Tremont St., cor. Whitney Pl., Ward 22, for Dennis Daley, dwell., 23′ x 39′, three-st'y pitch; McDonald & Tobin, builders.

Roslin Ave., near Washington St., Ward 23, for J. C. Becker, poultry-house, 8′ x 124′ and 8′ x 100′, one-st'y pitch; W. G. Becker, builder.

Paris St., *No.* 167, Ward 2, for John W. Kimball, storehouse, 23′ x 86′, one-st'y flat.

Adams St., near Mills St., Ward 24, for Joseph W. Hildreth, dwell., 22′ and 28′ x 30′, two-st'y pitch; Jos. W. Hildreth, builder.

Walnut Ave., cor. Cobden St., Ward 21, for Leonard Ware, Jr., dwell., 42′ x 42′ and 16′ x 30′, two-st'y pitch.

Rutherford Ave., near Dunstable St., Ward 5, for Beals & Bartlett, stable, 26′ 6″ and 39′ 9″ x 62′, three-st'y flat; Geo. W. Brown, builder.

Parker St., *Nos.* 717 *and* 719, Ward 22, for Wm. Goldsmith, 2 dwells., 20′ and 26′ x 45′, three-st'y flat; Samuel Rantiu, builder.

Farrington Ave., Ward 25, for Jesse Tirrell, 4 dwells., 20′ x 32′ and 14′ x 28′, two-st'y pitch; H. M. Perry, builder.

Alden Ct., off Green St., Ward 23, for Mary McMorrow, dwell., 26′ x 30′ and 15′ x 26′, two-st'y pitch; Melvin D. Ayers, builder.

Centre St., rear, near May St., Ward 23, for E. R. Butler, stable, 30′ and 36′ x 45′ 6″, one-st'y pitch; Wm. Smith, builder.

Pearl St., No. 23, Ward 3, for John H. Tomfahrde, dwell., 23′ x 52′, three-st'y flat; J. B. Maynard, builder.

Brooklyn.

BANK. — The Trustees of the Dime Savings Bank have selected Mercein Thomas architect of their new building; not T. T. Thomas, of New York, as stated.

BUILDING PERMITS. — *Sixth St.*, *No.* 242, e s, 22′ n North Fifth St., four-st'y frame double tenement, tin roof; cost, $6,000; owners, W. L. & A. M. C. Meyer, on premises; architect, T. Engelbardt; builder, Jacob Schoch.

Maujer St., *Nos.* 180 *and* 182, s s, 80′ w Humboldt St., three-st'y frame double tenement, tin roof; cost, total, $7,500; owner, Daniel Hutzelmann, 172 Maujer St.; architect, T. Engelhardt.

Nassau Ave., s e cor. Lorimer St., 2 three-st'y frame stores and tenements, gravel roofs; cost, $2,500 and $3,500; owners, corner building. —— Hendrickson, Lorimer St., inside building, Randall & Miller, 126 Manhattan Ave.; builders, Randall & Miller.

Vanderbilt Ave., e s, 219′ s De Kalb Ave., two-st'y brick stable; cost, $3,856; owner, E. H. Barnes, 222 Cumberland St.; builders, J. M. Brown and J. S. McKea.

Union St., n s, 92′ w Sixth Ave., 3 four-st'y brick double flats, tin roofs; cost, each, $12,000; owner, architect and builder, Thos. Green, 195 Sixth Ave.

Bedford Ave., n w cor. Hayward St., also, *Rutledge St.*, s w cor. Bedford Ave., 2 three-st'y brownstone front stores and tenements, tin roofs; cost, total, $16,000; owner and builder, Richard Healey, Hawes St., near Wythe Ave.; architect, I. D. Reynolds.

Bedford Ave., w s, between Hayward and Rutledge Sts., 8 two-st'y brownstone front dwells., tin roofs; cost, total, $40,000; owner, etc., same as last.

Belvedere St., e s, 100′ n Broadway, two-st'y frame dwell., tin roof; cost, $4,000; owner, A. Deitrich, 535 Grand Ave.; architect and builder, C. L. Johnson; masons, G. Lehrian & Sons.

Clifton Pl., *No.* 201, about 150′ n w Bedford Ave., two-st'y frame stable and dwell., gravel roof; cost, $2,800; owner, W. B. Matson, 389 Greene Ave.; builders, Morris & Selover.

Adams St., e s, 125′ s Myrtle Ave., four-st'y brick factory, tin roof; cost, $9,000; owner, Jas. Howell, Adams St.; architect, W. A. Mundell; builders, M. J. Reynolds and Morris & Selover.

Bedford Ave., e s, 51′ n Jefferson St., three-st'y brick stable, tin roof; cost, $7,000; owner, F. J. Washburn, 708 Bedford Ave.; architect and builder, W. H. Burhaus; mason, C. King.

Putnam Ave., *Nos.* 295 *to* 301, 100′ e Nostrand Ave., 2 four-st'y brick double flats, gravel roofs; cost, each, $15,000; owner and builder, T. W. Swimm, Bates Ave.; architect, Amzi Hill.

Eighteenth St., *No.* 206, 300′ w Fifth Ave., two-st'y and basement brick dwell., tin roof; cost, $4,000; owner, Jas. Woodhead; architect, A. V. B. Bush.

Clinton Ave., e s, 143′ s Myrtle Ave., three-st'y and attic brick dwell.; cost, $18,000; owner, Chas. Dingee, 236 Washington Ave.; architect, C. Werner; builders, J. D. Anderson and Martin & Lee.

Portland Ave., w s, 225′ n Lafayette Ave., 2 three-st'y brownstone front dwells., tin roofs; cost, each, $12,000; owners, Litchfield & Dickinson, 214 State St.; architect, C. Werner; masons, J. De Mott & Son.

Water St., s s, 219′ w Main St., one-st'y brick foundry; also, four-st'y brick shop, gravel roofs; cost, total, $10,000; owner, Jas. Mitchell, Water St., near Fulton Ferry; architect and builder, F. D. Norris; mason, Thos. Donlon.

Flushing Ave., n s, 40′ w Bogert St.; three-st'y frame double tenement, tin roof; cost, $4,000; owner, Roswell C. Williams; architect, C. Werner; builder, Jacob Schoch.

Middleton St., s s, 160′ e Harrison Ave., 4 three-st'y frame double tenements, tin roofs; cost, each, $4,500; owner, B. Bosert, Harrison Ave.; architect, J. Platte; builders, J. Ance and F. Hertz.

Sterling Pl., n s, 235′ 5″ w Seventh Ave., three-st'y brick stable, tin roof; cost, $21,500; owner, Norman L. Munro, 57 Seventh Ave.; architect, A. Stringham; builders, H. D. & W. A. Southard.

Seventh Ave., w s, 30′ 6″ s Carroll St., 3 four-st'y brownstone front tenements, gravel roofs; cost, each, $6,000; owner, W. G. Brown, 728 Fulton St.

Chicago.

DWELLINGS. — L. G. Hallberg has completed plans for Mr. J. Foster Rhodes for a house on Rhodes Ave., cor. Thirty-second St., 50′ x 55′, of limestone and brick.

Mr. J. Van Osdel has plans ready for a dwelling for Mr. Samuel Baker, to be built at Ellis Ave., cor. Fortieth St., Queen Anne style; to cost $13,000.

Burling & Whitehouse are architects for three dwells. on La Salle Ave. for Mr. Kirkwood, brick and terra-cotta; cost, $30,000.

Dixon & Townsend are building for Mr. L. W. Pitcher a house on Prairie Ave., of pressed-brick and stone; to cost $12,000.

FACTORY. — Edbrooke & Burnham have planned the addition to Kirk's factory in the North Division. The expense will be $40,000. The building will then be 60′ x 125′, five stories and basement.

FLATS. — B. W. S. Clark has plans ready for flats to be built for J. J. Shutterly, on Park Ave., to cost $10,000.

The same architect has prepared plans for flats on Western Ave., to cost $10,000.

Architect W. L. Carroll has planned a two-st'y building for flats, pressed-brick, with stone finish, for Mr. Thomas Pond, on May Street.

Plans are completed by P. W. Ruehl, architect, for a three-st'y building for flats on West Taylor St.; cost, $7,500.

The same architect has plans ready for flats to be built on Ewing St., for J. A. Craig, to cost $8,000.

Also a three-st'y building for flats, 50′ x 75′, for C. Rosulek, to cost $15,000.

OFFICES. — Ground has been broken at corner of Michigan Ave. and Adams St. for a large office-building for the Pullman Palace Car Company. The front on Michigan Ave. will be 120′, and 176′ on Adams St., to cost $500,000.

W. L. B. Jenney has had charge of remodelling the Tobey Building, cor. of State and Jackson Sts., into an office-building, at a cost of $80,000.

WAREHOUSES. — Mr. H. Siercks has drawn plans for the warehouse to be built, corner of Michigan and Lasalle Sts., for Mr. W. C. Lobenstein. It is to be four stories and basement.

Mr. David Wiley will soon build a large fire-proof warehouse on the cor. of Clark and Twelfth Sts.

BUILDING PERMITS. — H. H. Garstens, three-st'y basement brick tenement, 38′ x 80′, 61 Hubbard St.; cost, $10,000.

F. Kaersten, two-st'y brick dwell., 22′ x 62′, 242 Vine St.; cost, $3,200.

A. Kirkwood, 2 three-st'y basement brick dwells., 38′ x 62′, 336 and 338 Lasalle Ave.; cost, $6,500.

Chas. Schwarze, two-st'y and basement store and dwell., 21′ x 60′, 345 North Ave.; cost, $3,500.

John Kollassa, two-st'y basement and attic brick dwell., 21′ x 56′, 30 Bradley St.; cost, $3,606.

Morley & Ramsdell, 2 two-st'y brick dwells., 46′ x 58′, 1000 and $1002 Adams St.; cost, $8,000.

A. Crane, 4 brick cottages, each 20′ x 38′, Emerald St.; cost, $4,000.

Board of Education, three-st'y basement brick school-house, 86′ x 117′, Wentworth St., cor. Thirty-third St.; cost, $70,000.

James Buehan, two-st'y brick dwell., 44′ x 45′, 703 West Chicago Ave.; cost, $4,500.

M. Buckley, brick livery stable, 34′ x 100′, 215 Robey St.; cost, $6,000.

Joseph Kral, three-st'y brick store and dwell., 24′ x 60′, 423 Eighteenth St.; cost, $4,700.

J. Anderson, two-st'y brick store and dwell., 24′ x 60′, 160 Centre St.; cost, $5,000.

Chas. Breytspraak, two-st'y brick flats, 22′ x 46′, 92 Wendell St.; cost, $4,400.

W. Troost, two-st'y brick dwell., 32′ x 70′, 419 Dearborn Ave.; cost, $20,000.

B. Stowell, two-st'y brick dwell., 20′ x 50′, 459 Dayton St.; cost, $4,300.

E. Sweenie, two-st'y basement brick flats, 22′ x 50′, 453 Taylor St.; cost, $3,000.

J. N. Gage, 8 two-st'y brick dwells., 66′ x 132′, Adams St., w of Oakley St.; cost, $24,000.

Mrs. F. A. Huber, two-st'y brick dwell., 24′ x 60′, 721 Larrabee St.; cost, $7,000.

L. A. Watson, brick basement, 34′ x 100′, Depuysler St.; cost, $3,50.

H. R. Wilson, two-st'y brick dwell., 21′ x 37′, 629 Monroe St.; cost, $3,000.

Chas. H. Clingman, two-st'y brick dwell., 24′ x 39′; cost, $5,000.

Wm. Gregory, two-st'y basement brick flats, 22′ x 38′, 21 Wilson St.; cost, $3,500.

H. Giselbracht, 5 two-st'y basement and attic brick dwells., 174-182 Lasalle Ave.; cost, $15,000.

Jno. Edwards, two-st'y brick dwell., 24′ x 60′, Wabash Ave., near Thirty-fourth St.; cost, $7,000.

M. Burback, three-st'y brick flats, 22′ x 45′; cost, $4,000.

F. Gabarek, two-st'y brick flats, 21′ x 56′, 739 Loomis St.; cost, $4,000.

Thos. Fauland, two-st'y brick dwell., 22' x 59', 274 Loomis St.; cost, $4,000.

Mrs. F. Griffin, three-st'y basement brick store and dwells., 26' x 50', 879 North Clark St.; cost, $8,000.

Conrad Gehrke, three-st'y basement and attic brick flats, 22' x 69', 179 East Huron St.; cost, $6,000.

Jno. Polka, two-st'y basement brick flats, 21' x 56', 600 Throop St.; cost, $3,000.

H. Pilgrim, two-st'y basement brick dwell., 21' x 50', 637 Harrison St.; cost, $3,500.

C. Kaun, two-st'y basement and attic brick store and flats, 24' x 64', 2604 Wentworth St.; cost, $3,500.

Mrs. M. Griffith, 2 two-st'y basement brick dwells., 33' x 70', 973 and 975 Adams St.; cost, $5,000.

Chas. Cobsgen, three-st'y basement brick store and flats, 25' x 82', n e cor. North Ave. and Dayton St.; cost, $10,000.

O. H. Roche, two-st'y brick barn, 40' x 46', 2442 Michigan Boulevard; cost, $3,500.

Mrs. Anne Davis, two-st'y basement brick dwell., 20' x 38', Vernon Ave.; cost, $4,000.

B. Wolf, two-st'y basement brick dwell., 24' x 76', 3448 Wabash Ave.; cost, $8,000.

Anson Stager, brick additional story, 26' x 92', 1737 Michigan Ave.; cost, $15,000.

J. S. Kirk, five-st'y basement brick factory, 60' x 90', North Water St.; cost, $25,000.

C. W. Marks, brick additional story, 27' x 91', 6 East Washington St.; cost, $4,000.

Wm. Scott, 2 two-st'y brick dwells., 33' x 48', 851–859 Adams St.; cost, $5,600.

Cincinnati.

Building Permits. — Jas. L. Haven, three-st'y brick building, n s Commerce St., between Elm and Plum Sts.; cost, $3,400.

Jas. Blackard, two-st'y brick building, e s Gilbert Ave., between Locust and Kemper Sts.; cost, $3,000.

Ed. Bice, two-st'y brick building, n e cor. June and Reading Sts.; cost, $2,000.

Miss Ella Piatt, two-st'y brick building, York St.; cost, $3,500.

John C. Thoms, repair two-st'y brick building, w s Central Ave., between Fourth and Fifth, known as Thoms's Hall; cost, $15,000.

E. Gurney, three-st'y frame building, Browne St.; cost, $4,500.

John J. Pfeffer, three-st'y brick building, cor. Harriet and Gest Sts.; cost, $7,000.

Repairs; cost, $3,375.

Jersey City, N. J.

Building Permits. — T. Garvin, frame building, 20' x 36'.

W. P. Vreeland & Co., frame building, 5' x 20'.

J. E. Hewett, frame extension, 20' x 30'.

Wm. Winberry, 59 Newark Ave., to raise building 10 feet, when completed not to exceed 22 feet high.

Domestic Spring Bed Co., Railroad Ave., frame building, 50' x 50'.

P. Obergfell, No. 157 Ninth St., frame building, 25' x 50'.

Stewart Carpet Cleaning Works, Nos. 88 and 90 Erie St., frame building, 27' 6" x 58'.

E. C. Dickinson, 88 Montgomery St., extension, 25' x 49', 22' high.

New York.

Apartment-Houses. — For Mr. Thos. Osborne a ten-st'y fire-proof apartment-house, 100' x 150', is to be built on the n w cor. of Fifty-seventh St. and Seventh Ave., from designs of Mr. Jas. E. Ware. The front is to be of stone, and the cost about $550,000.

For Mr. R. T. Auchmutz a four-st'y apartment-house, 50' 3" x 100', is to be built on the s w cor. of Second Ave. and Sixty-eighth St., from designs of Mr. Geo. B. Post.

Bank-Building. — The Building Committee of the Mercantile Bank & Manhattan Co., have accepted the plans of Mr. W. Wheeler Smith for the building they are to jointly erect at Nos. 40 and 42 Wall St.

Cable Office. — The plans of Mr. Henry J. Hardenbergh have been accepted by the Western Union Telegraph Co., for their cable-office on Broad St. The Company have also called for competitive plans for the new building which they have decided to build on the s w cor. of Fifth Ave. and Twenty-third St.

Contract. — John I. Tucker has the contract for building the Mercantile and Mechanic Bank Building.

Cotton Exchange. — Mr. George B. Post's designs for the Cotton Exchange Building have been accepted.

Flats. — A block of flats with stores below is to be built on Broadway, corner of One Hundred and Thirtieth St., from designs of Mr. I. F. Burrows. They are to be 25' x 84' each, four stories high, brick and terra-cotta, and will cost about $50,000.

Houses. — On the east side of Madison Ave., between Fiftieth and Fifty-first Sts., two houses, 30' x 70' each, four stories high, are to be built from designs of Mr. A. B. Jones, one for Mr. T. F. Oakes, the other for Mr. A. H. Holmes. They will have brownstone fronts.

Removals. — The Mechanics' and Traders' Exchange have moved their rooms to No. 14 Vesey St.

May 1 caused quite an exodus of architects from "down-town" to "up-town" quarters.

Store. — Messrs. Arnold, Constable & Co. propose to enlarge their present store by building in the rear of their premises running through from Eighteenth to Nineteenth St.

Church. — Grace Church is to have a new stone steeple and improvements made at a cost of $50,000.

Building Permits. — *West Forty-eighth St., Nos.* 418, 420, 422, 424, *and* 426, 5 five-st'y brick tenements, tin roofs; cost, each, $15,000; owner, John Foutham, 258 West Forty-seventh St; architect, Wm. E. Bishop.

Courtland Ave., e s, 28' 3" n One Hundred and Forty-eighth St., three-st'y frame dwell. and store, tin roof; cost, $5,100; owner, Chas. Spillner, 534 Courtland Ave.; architect, Henry Piering.

East Twenty-second St., Nos. 312 *and* 314, five-st'y brick workshop, tin roof; cost, $12,000; owners, Samuel Bailey & Son, 211 East Twenty-second St.; architects, Youngs & Campbell.

Bedford St., Nos. 41 *and* 43, five-st'y brick and stone flat, tin roof; cost, $25,000; owner, Mary McManus, 231 East Seventy-ninth St.; architect, Louis Ungrich.

Third Ave., n w cor. Ninety-fifth St., 4 five-st'y brownstone front tenements and stores, tin roofs; cost, each, $12,000; owner and builder, John D. Karst, 2006 Second Ave.; architect, F. S. Barus.

Avenue A, s e cor. Fifty-seventh St., four-st'y brick tenement, tin roof; cost, $15,000; owners, Schmitt & Schwanenfleugel, 165 East Fifty-ninth St.; architects, A. Pfund & Son.

One Hundred and Fourteenth St., n s, 325' e First Ave., 3 four-st'y brick tenements, tin roofs; cost, each, $8,000; owner, Margaret Schmitt, 428 East One Hundred and Twenty-second St.; architect, Geo. W. Walgrove; builder, Frank Schmitt.

One Hundred and Twenty-sixth St., s s, 330' e Seventh Ave., three-st'y brownstone front dwell.; cost, $20,000; owner, Samuel O. Wright, 255 West One Hundred and Twenty-seventh St.; architects, Cleverdon & Putzel.

West Thirteenth St., No. 1, five-st'y brick tenement and store, tin roof; cost, $14,000; owner, F. W. Hurtt, 503 Fifth Ave.; architect, Wm. H. Hume.

Alterations. — *Rose St., No.* 18, repair damage by fire; cost, $4,750; owner, Thos. H. Crosley, 23 Rose St.; builders, Thos. Donlan and T. E. Smith.

East Eighty-seventh St., No. 118, three-st'y brick extension; cost, $3,000; owner, Wm. L. Becker, on premises; architect, John Brandt.

East Seventy-fifth St., No. 236, alterations and repairs; cost, $3,500; owner, Annie B. Taylor, Brooklyn; builder, Chas. M. Guillianme.

Fourth Ave., s w cor. Sixty-third St., raise three stories; cost, $9,000; owner, estate of Wm. R. Stewart, Mary M. Stewart, extrx., 843 Fifth Ave.; architect, M. C. Merritt.

Hudson St., e e cor. Beach St., raise two stories and a six-st'y brick extension, tin roof; cost, $10,000; owner, Patrick Lenane, 323 West Fiftieth St.; architect, M. C. Merritt.

Chrystie St., No. 160, internal alterations; cost, $5,000; owner, City of New York; architect, D. J. Stagg.

West Twenty-eighth St., No. 116, two-st'y brick extension, front wall taken down and rebuilt; cost, $5,000; owner, D. Lydig Suydam, 40 East Thirty-first St.; architect, H. Edwards Ficken; builder, Frank Lyons, Jr.

Philadelphia.

Depot. — The Pennsylvania Railroad Co. are building a freight and immigrant depot, 92' x 464', on the old navy-yard property, and will be used by the Red Star Line Steamship Co.

Banking-Building. — Properties Nos. 311 and 313 Chestnut St. will undergo alterations for banking purposes, the National Bank of the Republic being the purchaser.

Building Permits. — *Tenth St.*, s w cor. Buttonwood St., three-st'y store and dwell., 23' x 40'; Henry Kolp, contractor.

Wilder St., n s, e of Twentieth St., two-st'y dwell., 15' x 38'; Jas. Smith, owner.

Fifteenth St., n e cor. Christian St., two-st'y church-building, 60' x 91'; M. McConnell, contractor.

Tulip St., s e cor. Vienna St., 2 three and 2 two st'y dwells., 17' x 51' and 15' x 32'; Jno. M. Buchanan.

Kimball St., s s, w of Twenty-first St., 6 two-st'y dwells., 14' x 26'; Robert Kaighn, contractor.

Walter St., n s, w of Fifteenth St., three-st'y dwell., 15' x 24'; Wm. R. Brady, owner.

Chatham St., n w s, s of Allegheny Ave., 3 two-st'y dwells., 14' x 44'; Jas. Young, owner.

Baring St., n s, w of Thirty-third St., three-st'y dwell., 19' x 52'; Geo. McNichol, contractor.

Fifth St., e s, n of Butler St., 2 two-st'y dwells., 16' x 44'; Christian Joos, contractor.

Parker Ave., s s, w of Ridge Ave., 2 three-st'y dwells., 15' x 32'; Amos Mattis, owner.

Moravian St., s s, rear No. 1429 Walnut St., three-st'y brick building, 18' x 40'; Benj. Ketcham, contractor.

Spring Garden St., No. 3902, 4 three-st'y dwells., 15' x 45'; J. R. Garber, contractor.

Columbia Ave., No. 2616, three-st'y dwell., 17' x 50'; Jno. Klebe, contractor.

Wildey St., cor. Richmond St., four-st'y addition to factory, 35' x 50'; Jas. Hood.

School St., n s, near Township Line, three-st'y dwell., 36' x 69'; Geo. A. Sorber, contractor.

Pepper St., e of Sepviva St., 4 two-st'y dwells., 14' x 33'; Thos. L. Kelly, owner.

Forty-eighth St., cor. Darby Road, third-st'y addition to "Home," 36' x 87'; W. C. McPherson, contractor.

Longshore St., n w cor. Dithinan St., two-st'y school-house, 60' x 100'; F. W. Tweed, contractor.

Pechin St., w s, w s cor. Freedland St., w of Shurs' Lane, 5 dwells., 16' x 40'; Wm. H. Rainer, owner.

Jefferson St., n w s, n e of Fowler St., 3 three-st'y dwells., 16' x 42'; Harry Rowland.

Oregon St., Nos. 4104, 4106 and 4108, 3 two-st'y dwells., 16' x 43'; E. J. Lynch, contractor.

Filbert St., No. 1429, new front and three-st'y brick building, 18' x 36'; W. T. Mead.

Wallace St., n s, w of Twenty-third St., 2 three-st'y dwells., 18' x 52'; Cook & Furman.

Otis St., w s, s of Moyer St., three-st'y dwell., 20' x 58'; Brown & Engles, contractors.

Orthodox St., n s, e of Asylum Road, three-st'y dwell., 20' x 50'; E. S. Lewis, contractor.

Clinton St., w s, between Baker and Barr Sts., 2 three-st'y dwells., 16' x 32'; McLaughlin & McNamara, contractors.

Mervine St., e s, s of Columbia Ave., three-st'y dwell., 16' x 50'; C. C. Carman.

Penn St., No. 4727, third-st'y addition to dwell., 16' x 32'; M. C. Chamberlin, contractor.

Emerald St., n w cor. Huntingdon St., 5 two-st'y dwells., with one store, 16' x 44'; Dickson Bros., contractors.

Twenty-seventh St., s w cor. Fletcher St., 4 two-st'y dwells., 16' x 27'; Samuel Stewart, contractor.

Thirty-seventh St., No. 15, three-st'y dwell., 16' x 46'; Wm. Bunch, Jr.

North College Ave., No. 2507, three-st'y dwell., 15' x 38'; J. Sims Wilson.

Clairborn St., w s, s of Norris St., two-st'y dwell., 14' x 28'; Samuel Sabins, owner.

North Sixteenth St., No. 1523, three-st'y dwell., 21' x 74'; H. M. Martin, contractor.

Nineteenth St., w s, s of Wharton St., 16 two-st'y dwells., 14' x 40'; Patrick Fleming, owner.

Ridge Ave., w s, s of Leverington Ave., two-st'y dwell., 23' x 46'; Jacob Shingle, owner.

Somerset St., s s, e of Almond St., two-st'y dwell. and two-st'y front building, 16' x 40'; Chas. Judge, contractor.

Main St., n e cor. Mt. Pleasant St., one-st'y chapel, 60' x 66'; Wm. Garvin, contractor.

Ripka St., n w s, n of Washington St., three-st'y dwell., 17' x 32'; W. R. Davis, contractor.

Thirty-fourth St., e s, n of Powelton Ave., 3 three-st'y dwells., 20' x 72'; W. H. Kimball, owner.

Adam St., n e cor. Cedar St., two-st'y store and dwell. and two-st'y dwell., 17' x 45'; Jno. S. Baldt & Son.

Sixth St., w s, s of Moyamensing Ave., 6 two-st'y dwells., 18' x 30'; W. J. Smith, contractor.

Virginia St., Nos. 2336 *and* 2338, 2 two-st'y dwells., 16' x 28'; Francis Black, contractor.

Master St., e s, e of Mascher St., 2 three-st'y dwells., 16' x 28'; E. Schmidt, contractor.

Wellington St., w s, n w of Kensington Ave., two-st'y dwell., 17' x 28'; Daniel Regester, contractor.

Cumberland St., n s, between Eighth and Franklin Sts., 9 three-st'y dwells., 2 with stores, 15' x 52'; C. H. Wisler, owner.

Leiper St., w s, n of Arratt St., two-st'y stable, 30' x 42'; Wm. Keas, contractor.

Centre St., s e, e of Thirty-seventh St., 4 two-st'y dwells., 12' x 30'; L. W. Goodman, contractor.

Allegheny Ave., s s, e of Whittie St., three-st'y boiler and engine house, 22' x 30'; Samuel R. Stewart, contractor.

Capewell St., No. 1416, two-st'y dwell., 14' x 28'; A. T. Richards, contractor.

Powelton Ave., cor. Thirty-ninth St., one-st'y hospital, 33' x 144'; A. T. Richards, contractor.

Fifty-eighth St., cor. Darby Road, addition to hospital, 35' x 72'; A. T. Richards, contractor.

Bowers St., No. 554, three-st'y dwell., 18' x 30'; Shegog & Quigley, contractors.

Twenty-seventh St., s e cor. Oxford St., 3 two-st'y dwells., 15' x 42'; Cotterell & Johnson, contractors.

Spring Garden St., n s, between Thirty-eighth and Thirty-ninth Sts., 3 three-st'y dwells., 16' x 50'; Jno. Kelly, owner.

Pear St., n s, between Fifty-second and Fifty-third Sts., 2 two-st'y dwells., 16' x 32'; Chas. Christine, contractor.

Thompson St., n e cor. Neff St., two-st'y school-building, 60' x 97'; Chas. O'Neill, contractor.

Portland, Oregon.

Houses. — M. Owens is building a two-st'y house; cost, $3,000.

Capt. Bolles, a two-st'y house; cost, $5,000; Irving & Kept, contractors.

Dr. Jones, a residence; cost, $9,600; Mr. Angelo, contractor.

G. H. Williams, 3 dwells.; cost, $10,000.

J. Slavich, two-st'y residence; cost, $4,000.

Three double residences are being built for J. M. Kenworthy; cost, $12,000; E. M. Burton, architect.

S. Bluman is putting up a fine residence; cost, $10,000; R. Porter, contractor; W. H. Williams, architect.

Stores. — J. Morgan is putting up a two-st'y store, 50' x 50'; cost, $6,000; J. Krumbein, architect.

C. A. Landenberger is putting up two stores; cost, $9,000; Irving & Kept, contractors; Krumbein, architect.

Mr. Opitz, three-st'y brick block; cost, $33,919; John Robertson, contractor; Joseph Sherwin, architect.

A. P. Hunting, 3 stores; cost, $4,009.

A. H. Johnson will build a business block, four-st'y, 100' x 100'; cost, $100,000.

John Wilson, three-st'y brick store, 75' x 100'; cost, $40,000; R. Porter, contractor; W. H. Williams, architect.

Church. — Scandinavian church; cost, $3,000; Peterson & Johnston, contractors.

Machine-Shop. — Heintz & Mason are building a machine-shop; cost, $7,000.

Toledo, O.

Contract. — Contract for the new "Hall Block" St. Clair St., cor. Jefferson St., has been awarded to A. Bentley; cost, about $70,000. Plans were made by Mr. Palmer, architect, of Chicago. The work will be under the supervision of E. O. Fallis, architect, of this city.

Hotel. — Addition to and remodelling American Hotel, St. Clair St.; J. E. Morehouse, architect; John Groenwold, owner; John Arnsman, contractor; cost, about $8,000.

Memorial Building. — Plans of Soldiers' Memorial Building are being prepared by Messrs. Gibbs & Stein. The site is on Ontario St., between Madison and Adams Sts.

Stores. — Excavation has been commenced for a three-st'y brick building, 50' x 10 ', on Perry St., for Mr. E. D. Potter, Jr.; will cost when completed about $15,000; N. B. Bacon, architect; C. V. Cook is superintendent and builder.

Excavation is commenced for two-st'y brick and stone building, cor. of Adams and Summit Sts., for Mr. C. Bronson, 40' x 114'; cost, about $15,000; L. B. Stevens, builder.

Store-building, Summit St., between Madison and Adams Sts., three-st'y, brick and stone, for Mr. Tracy, Sr., 40' x 110'; N. B. Bacon, architect; A. Lombard, builder.

Store-building, 40' x 108', Summit St., between Adams and Oak Sts., brick and stone, three-st'y and basement; J. Hallet, owner; N. B. Bacon, architect; plans being prepared.

House. — Two-st'y frame dwell. for Mr. George Brigham, Jefferson St.; cost, about $2,500; M. A. Stegenga, builder.

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THERE is room for considerable doubt whether telegraph and telephone companies are entitled to the privilege which they assume of carrying their lines over the roofs of houses without the owner's permission, even though the wires may be strung at such a height above the roof as to prevent them from coming in contact with it. The common belief in regard to the possession of real-estate is that the purchaser of any given piece of land is understood to acquire with it a pyramid of the earth's substance having his lot as a base, and terminating at the centre of the globe, as well as a further volume of air or ether, extending upward from his lot an indefinite distance into space; and as the law seems to have been well settled in the case of the London underground railway, that no one can be compelled to submit without compensation to having a tunnel carried beneath his estate, it seems only reasonable to suppose that the stringing of wires at any height above a building is equally an infringement of the rights of its owner. As it happens, a case has recently occurred, in which the question of the respective privileges of the parties under such circumstances is involved, and as the courts have been called upon to define them, the result will be interesting. In this instance, the tenant of a building in Philadelphia, over which the wires of the Bell Telephone Company were carried, against his remonstrance, at a distance of five and one-half feet above the roof, considering that his privileges as a tenant were infringed, although the wires were not attached to, or supported from, the roof, tied them up, so as to keep them out of the way. This interfered with the working of the lines, and men were sent to put them in order. These men necessarily went through the house to get to the roof, and the tenant notified the company that he would not allow the wires to be used without compensation. No response was made to this, and he finally tied up the wires again; whereupon the company brought an action against him for malicious mischief. It is quite probable that the suit will be compromised, as the telephone companies would hardly dare to run the risk of a decision adverse to them, and such a decision, in view of the circumstances, might not be unreasonable.

AMID the noise of the universal outcry against overhead telegraph wires, which bids fair to compel the use of buried cables in most of our cities, it might be worth while to inquire whether we are quite sure that the public in general will be as much benefited by the change as a few patentees and other holders of valuable monopolies relating to underground electric lines. A few days ago it was our fortune to pass through a certain street in which an underground cable was laid two or three months ago. The laying of the cable seemed to have been a difficult matter, as the street was barricaded for some days while operations were going on; and the repairs, or whatever else might have been in progress at the time of our late visit, were, as it seemed, also serious enough to call for the blockading of a large part of a very wide thoroughfare. It must have been impossible for one interested in the subject to see the barriers erected again without some gloomy forebodings as to the future of our principal streets when each shall have, not one, but a dozen electric cables buried in it. As certain telegraph officials have already explained, it is impossible to guarantee the continued insulation of wires covered with gutta-percha or paraffine, if they happen to be brought near a hot steam-pipe; and this circumstance alone, in a city like New York, where steam-heating companies and subterranean-wire corporations have equal rights in the same streets, must, independent of the shifting of cables, if all wires are put below the surface, soon lead to an interminable and exasperating succession of those interruptions to traffic which have already, through the operations of the steam-heating companies alone, driven the citizens nearly to desperation.

IF electric cables must be buried in the streets, we must make up our minds either to permit the pavements to be continually torn up to change or repair them, or to go without using them. There is now no middle ground between these two alternatives. At the best, those who use the telephone must be prepared, if their wires are removed from the house-tops, to find the efficiency of their instruments much diminished; and it may be doubted whether, after their communication with the more distant places has been cut off, and that with nearer points reduced to the faint whisper now characteristic of telephone signals through cables below ground, this important portion of the community will not be found disposed to return, if not to the present system, at least to one different from any yet proposed in this country.

THE English journals announce the death of a man, who, although hardly acknowledged as an architect by the profession, not only distinguished himself greatly in his day by the buildings which he designed and carried out, but for a time exercised a great influence upon the practice of the art. This man, it need hardly be said, was Major-General Scott, who died at Sydenham, on the sixteenth of April, at the age of sixty-one. Educated as a military engineer, General Scott was for many years instructor in surveying and astronomy at the military school at Chatham, and acted also as adviser to the Military Education Department of the War Office. On his retirement from the army in 1871 he was made Director of the public buildings in South Kensington, acting, after the death of his predecessor, Captain Fowke, as architect of the Science Schools and the Royal Albert Hall. The assiduity with which he devoted himself to these buildings, and the novelties in design and construction which he introduced in them, are well known. In the Science and Art Schools terra-cotta was used for the first time on a very extensive scale; and it is due to General Scott to say that notwithstanding what we might call a few grammatical slips in other portions, the material which he introduced was employed with a freedom and success which has hardly since been surpassed. The Albert Hall is less successful as a design than the other building, but contains a great deal that is novel and suggestive. In details of construction General Scott was as studious and inventive as in his designs. His experiments upon the various matrices used for practical purposes led him to the important discovery of selenitic mortar, in which ordinary unslaked lime, by the addition of small, regulated quantities of dissolved plaster-of-Paris, or even of sulphuric acid, is made to take a new character, acting as a strong hydraulic cement. Until very lately General Scott was actively engaged in construction, his last work being the building for the International Fisheries Exhibition.

TWO engineering works which were, when first projected, a few years ago, denounced as impracticable and useless, will probably be duplicated before long in order to enable a second set of stockholders to share in the rich profits which have rewarded or will reward those who had the courage to persist in carrying out the original scheme. The Hudson River Tunnel is not yet completed, but its importance to the carrying trade of the future has become so obvious that a second tunnel under the river has already been surveyed, and will probably be in process of execution before the first is fairly open. The second tunnel will cross the Hudson a mile or so below the first, extending from a point near the foot of Courtlandt Street to the terminus of the Pennsylvania Railroad in

Jersey City, so as to enable trains from this and the New Jersey Central Railroad to run directly through it. On the New York side of the river it is intended to continue the tunnel under the City Hall Park to Elm Street, and thence by Lafayette Place and Fourth Avenue to Thirty-third Street, where it will merge into the tunnel which already occupies the upper part of Fourth Avenue. By means of this succession of underground roadways freight trains can pass from the tracks of the Pennsylvania Railroad directly upon those of the Hudson River and New Haven roads. Instead of passing through light silt, like the present tunnel, the new one will be bored through the rock from shore to shore, in order to secure the firmest possible road-bed for the heavy freight trains which will use it. The other important second-hand scheme is one for duplicating the Suez Canal, which is now crowded with business beyond its capacity, and earns immense profits. This project seems to have been formed in England, and it is said that the necessary money for carrying it into execution can easily be obtained.

IT seems that the story told in some of the daily newspapers several months ago, that the foundation for the pedestal of the great Bartholdi statue had already been laid by the United States Government, was premature; and excavations have only just been begun on Bedloe's Island. The basis of the structure will be a mass of concrete, laid on the gravel which forms the subsoil of the island. The concrete monolith will be sixty-four feet square, and about fifteen feet thick, forming a very substantial foundation for the granite pyramid which is to rest upon it; and by a happy thought the spot chosen for it is in the centre of a small star fort, built about seventy years ago, whose ramparts and glacis will form a graceful transition between the formal outline of the pedestal and the grassy turf outside. Drawings of the statue and its supports have been received from France, and Mr. Richard M. Hunt has been entrusted with the task of designing the pedestal in conformity with the requirements of the case. Although less than half the money needed has been raised, there is little doubt that the remainder will be secured, but various considerations have determined the committee, with the engineer in charge of the work on the foundations, to defer the placing of the statue for another year. It seems that the great figure cannot be got ready for shipment for five or six months yet, so that the ceremony of inauguration could not take place before cold weather; and it is thought that under these circumstances it will be best to make sure of the solidity of the pedestal by allowing for its construction the whole period from the present time to the return of suitable weather for out-door festivities next year.

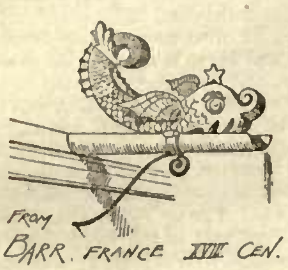
MR. CHARLES BUDDENSICK of New York, whose name was made famous some years ago by the investigation of the *Sanitary Engineer* into the character of the houses which he built and sold, seems to have been very little affected by the unpleasant publicity then given to his practices, and is still occasionally reported as coming into collision with the officers of the City Board of Health. According to the official report of the Board for the third week in April, one of the innumerable houses recently built and owned by him was found, although occupied, to have no drain; the soil-pipe discharging all the matter which passed through it into the cellar. This extraordinary sort of drainage would, in any other city than New York, seem to have been the result of some accident, but it is not too much to say that with a certain class of builders in that town such things only prove to have been accidental after they are found out by the inspector. We remember a case where a store and tenement on Broadway, on being measured for remodelling, were found never to have had any communication with the drain. The soil-pipe ended under the lowest floor, and the workmen employed in making the required changes were obliged to construct a kind of raft, on which to make their way through the sea of filth. In this case the senses of the inmates of the building, might, it would seem, have indicated the existence of some sanitary defect, but with new houses detection is more difficult. A story is told about a certain house recently completed by one of the Buddensick tribe, in which the Inspector for the Board of Health found that the regulation for foot-ventilation to the soil-pipe had not been complied with. He ordered the deficiency supplied, and received a promise of obedience. On his next visit he found the inlet-pipe apparently in position, opening in the usual manner at the edge of the sidewalk; but something aroused his suspicions, and pulling gently on the rim, it came away altogether, and proved to a short fragment of pipe, stuck in the sidewalk at the proper place, but having, of course, no connection with the plumbing.

A WRITER in *La Semaine des Constructeurs* describes a mode of protecting cellars against water from outside which may be found of considerable value. The process seems to have been first used by an engineer at Maestricht, in Holland, who, wishing to avail himself of the impermeability and adaptability of clay for such purposes, met with complete success in employing it as a thin film between two bodies of masonry. Beginning with a bed of bricks, laid flat, in two courses, slightly hollow in the middle, so as to form an inverted arch, he put over this a coating of clay about three inches thick. The clay was put in place dry, in fine powder, carefully sifted and pressed down. Over this a single course of bricks was laid dry, and the joints then filled with powdered clay, and finally a brick pavement in the form of an inverted arch, eighteen inches thick, was built over the whole. The side walls of the cellar were built double, with a space of three inches between, which was filled with dry powdered clay, put in in courses about eight inches deep, rammed down, and covered with a strip of wood to prevent mortar from falling into it. With care in execution, this device for water-proofing the cellar proved perfectly successful. This seems to be an improvement on a process much used in Boston for "boxing" cellars below the level of tide-water, by driving sheet-piling all around them, and filling the interval between this and the outside of the stone walls with a tenacious and uniform quality of clay, obtained in abundance in the neighborhood, and known as "boxing clay." The protecting mass of clay is usually a foot or more in thickness, and is put in in its natural condition, but well mixed and rammed. Of course, the bottom of the cellar cannot be protected by this means, but as the hydrostatic pressure of the exterior water is not very great, a thick bed of concrete well joined to the walls serves to resist it.

THE *Builder* gives a brief statement of the present capital of the principal English railways, which is instructive as showing the comparative poverty and immaturity of our own lines. At the end of 1882 the capital of the London and Northwestern Company amounted to four hundred and thirty-four million dollars; that of the Midland Company was three hundred and fifty millions; that of the Great Western was three hundred and forty millions, and that of the North-eastern two hundred and eighty millions. The value of the property, as represented by the capital, of twelve railway corporations was twenty-five hundred million dollars; while the number of miles of road owned by the same corporations was something over eleven thousand. This gives a capitalization of more than two hundred thousand dollars per mile of road, but it must be remembered that railway companies in England hold great numbers of hotels and other buildings as a part of their property, and it is said, even carry on a regular livery-stable business in many towns. As in this country, each of the great corporations has been made up by gradual accretion of several smaller ones, which, after a precarious existence of rivalry and competition, have consolidated into a vast monopoly.

THE mistake through which the wonderful little city of Zuñi narrowly missed being deprived of its water-supply by an error in a survey, which excluded from the boundaries of the Zuñi reservation the Nutria Springs originally granted to the tribe, has been rectified by an executive order from President Arthur, adding the tract containing the springs to the present reservation. It seems that the Indian chiefs, after the original grant, mislaid the document describing the boundaries of their property, and a miscalculation in a survey, about which they knew nothing, laid open the most valuable part of their land to be claimed by any one who happened to fancy it. Until lately, no one has cared to interfere with their possession, but a few months ago a party of gentlemen, in search of lands for cattle-breeding, discovering that a piece of property so valuable for their purpose in that arid country as one including abundant springs was open to preëmption, very naturally filed an application for it. The Zuñis being unable to produce evidence of their prior right, and the claimants, who were acting strictly within the law, being unwilling to withdraw, a serious dispute arose which the action of the President has settled in the best possible way.

SEWAGE DISPOSAL FOR ISOLATED HOUSES.



It is now clearly and generally understood that the all-prevailing cesspool used for the disposal of household wastes is in every respect pernicious and objectionable. It would hardly be too strong a statement to say that the best cesspool is worse than the best sewer; even where water-closet matter is excluded, the condition is not much improved. Thus far the cesspool has been the only means of disposal generally available where there were no sewers.

The slowly-growing and carefully-matured experience of the past fifteen years has, however, demonstrated the success of the system of sub-surface irrigation, or the disposal of foul liquids by open-jointed drain-tiles laid near to the surface of the ground, within reach of the roots of vegetation, as not only a very great improvement on the cesspool, but as being, in fact, as nearly perfect as the conditions of the case will probably allow.

This system originated, so far as we know, with the Rev. Henry Moule, of England, the inventor of the earth-closet, who published a description of its application in 1868. He had found that the use of the earth-closet was objected to for the reason that it fails to provide for the disposal of the liquid wastes of the house, leaving it necessary that a cesspool or sewer should be resorted to for this purpose, which might as well be also used in connection with water-closets. He tried the experiment of laying an open-jointed tile-drain a few inches below the surface of the ground along the foot of a trellis covered with grape-vines. The result was a vigorous growth and an improved fruitage of the vines, and an inoffensive and innoxious disposal of the waste liquids.

A few years later, Mr. Rogers Field made use of the same system in connection with the drainage of houses at Leatherhead, supplementing the drains with a flush-tank arranged to hold back the flow until it became full, and then to discharge it with one rush into the tiles, effecting thereby a long period of intermission, during which the soil was exposed to aeration and consequent purification, avoiding the constant saturation that a steady trickle from the house-drain would produce at the beginning of the drain, and bringing its whole length into equal requisition at each periodic outflow.

In this form the apparatus was somewhat extensively used in England and elsewhere. At my own house in Newport, where about two hundred feet of absorption tiles performed their office satisfactorily for eleven years, I interposed a settling-basin of about one hundred gallons capacity, in the course of the drain leading from the flush-tank to the absorption area. This held back coarser matters and a large proportion of the grease. There was, however, always some difficulty resulting from the adhesion of grease to the outlet of the flush-tank, requiring frequent cleaning of the siphon, and, later, such a disturbance of the accumulated matters in the settling-basin as caused flocculent and greasy particles to flow forward, and in time to choke the drains. It became necessary, from time to time (three times in the eleven years) to lift the whole series of tiles, wash them and replace them.

The next improvement was to place the settling-basin between the flush-tank and the house, serving as a grease-trap, protecting the siphon of the flush-tank against the gradual accretion of grease, and leaving only a relatively clear liquid to be discharged into the pipes. This was a great improvement, and practically effected all that was necessary where only the small flow of the kitchen-sink was to be taken care of. It was found, however, when it became a question of disposing of the entire waste of a house, including water-closets, baths, etc., that the flow into the settling-basin had at times sufficient force so to disturb its deposits as to cause a considerable amount of semi-solid matter to pass over into the flush-tank, leading, in time, to the obstruction of the drains. This has been remedied by constructing in the settling-basin a division-wall at right angles to the line of flow, and built to about the height of the ordinary water-level. This wall, dividing the basin into two chambers, confines the disturbance caused by the inflow to the first chamber. The flow from this into the other chamber, being in a thin stream over the top of the wall, does not disturb the deposits, and only the liquid passes into the flush-tank.

It has also been found that, whatever precautions might be taken, it might become necessary from time to time to take up parts of the absorption drains, to cleanse them from occasional obstructions. When such removal of the tiles becomes necessary, it is of the greatest importance that they should be relaid on their exact original grade. To the end that this removal and cleansing may be performed by any laborer, and in an inexpensive manner, it is desirable that the tiles be laid on a foundation that need never be disturbed. Strips of board serve this purpose well while they last; but their decay is somewhat rapid under such conditions, so that it is best in constructing the drain to lay first a line of earthenware gutters, carefully placed and never to be disturbed, and to lay the tiles in these.

Furthermore, whatever precautions we may take to prevent flecks of greasy matter from entering the drains, small amounts of such material will inevitably be carried forward with the discharge; so that if the tiles are laid with close joints, the ends actually touching each other, the narrow spaces, which serve a good purpose at the outset, will in time become choked with deposits, causing the drain to act as a tight pipe, except at these few points where, from breaks or other inequalities at the ends of the tiles, there is an unduly large opening. When the drains are in this condition, the escaping sewage confined to these points, under the pressure of the discharge from the tank, may here and there reach the surface, which is of course objectionable. To avoid this difficulty it is now my custom to require the tile-layer to carry a piece of thick sole-leather as a gauge, laying the drains with a distance apart equal to the thickness of the leather. Here again might come another difficulty: were such open joints allowed to remain unprotected, the covering earth would work through them into the tiles and cause obstructions. The joints are therefore covered with a short earthenware cap over the top.

In order to leave the space between the tiles as effective as possible for the escape of the sewage, the gutter and the cap are both made with a radius greater than that of the outside of the tile, so as to form a true bed and an efficient cover without hugging the joint, except at the very top and bottom.

These developments of the system, simple though they are, have been slowly worked out to meet the succession of difficulties which have arisen in practice. They have now had sufficiently long application, and sufficiently extensive trial to make it prudent to assert the practical efficiency of this method.

It is, in fact, a perfect system for the disposal of liquid household wastes, practically and theoretically, with a single limitation, viz.: it still involves the retention of a cesspool of very limited size. It is impracticable to allow the discharge of kitchen and water-closet matter, including paper, to flow directly into the flush-tank; it would soon obstruct the siphon, and so much of it as passed on into the drains would soon obstruct these. It is imperative that such matters should be withheld until by maceration, or by decomposition they will pass on in solution, or in suspension in the liquid flow. In so far as decomposition is necessary, the settling-basin is in a less degree subject to the theoretical objections that are made to the cesspool. It is, however, to be considered that this settling-basin, which is perfectly tight as to its walls, is so small that the volume of water passing through it takes up the products of decomposition, and carries them on to the drains before they assume a condition at all comparable to that of the permanent cesspool. It is found, practically, that the arrangement is inoffensive and safe.

The line of pipe (usually four-inch vitrified pipe) leading from the flush-tank to the absorption field, be it far or near, should have its joints tightly cemented. Its fall may be, during the early part of its course, as great as the lay of the land requires, but as it approaches the absorption tiles it should be reduced to 4 inches per 100 feet. Its joints should be tightly cemented until its depth becomes less than eighteen inches from the surface. It should have branch pieces for the connection of the absorption drains delivering from the *bottom* of the main. The absorption drains, of which the total length should be about equal to the number of gallons discharged at each operation of the flush-tank, — more in heavy soils and less in light soils, — should be laid in gutter tiles, of which the channel should be about ten inches below the finished surface of the ground. The system, carried out as here described, will, I am confident, be found much the most satisfactory that can now be adopted for the disposal of the liquid wastes of country houses, and even of village houses, having a small amount of available land; for example, the absorption ground may, without annoyance, be within 20 feet of the house (as my own was). For a family of six or seven persons, with an ordinarily light soil, 300 feet of absorption drain will be sufficient. As the tiles may be laid in parallel lines not more than 4 feet apart, there will be required only 1,200 square feet of ground. Small houses, using little water, may be served with a much smaller area.

This system of disposal by absorption drains has been successfully used by a number of architects and engineers, and its application at Lenox, Mass., for the disposal of the entire sewage of the village since 1876, at Sherborn, Mass., for the disposal of the wastes of the Women's Prison since 1879, and at the Bryn Mawr Hotel, of the Pennsylvania Railroad Company, for the sewage of that extensive establishment since 1881, are practical demonstrations of the success of the method above described.

It is now so perfected in its details that it may safely be adopted for common use. GEORGE E. WARING, JR.

SPRING EXHIBITIONS IN NEW YORK. — II.

Turning from the portraits to the other figure paintings at the American Artists' Exhibition we find them, I think, more important than usual. Especially in the number of small *genre* subjects is there an increase over past years — doubtless owing to the reasons which I have already pointed out as discouraging contributors from sending ambitious canvases. Mr. Fuller's figure called "Nydia" is, I find, a disappointment to many of his admirers, seeming but a weaker repetition of the aim and sentiment of his famous "Winifred Dysart," and his last year's contributions. Those

who think a title an important and integral part of a picture must certainly be disappointed, for there is no realization, no suggestion even, of Bulwer's blind girl in this dainty little maiden, and the faint Pompeiian indications in the background have small connection with the principal figure. Yet the picture seems to most observers, I am sure, a very lovely work. It is a proof that Mr. Fuller's is the sort of talent which can only be hindered and never helped by the choice of a literary subject, or the attempt to do illustrative work of any kind. He is a dreamer, with delicate visions of his own, not a thinker who can materialize the creations of another. Looked at apart from the promise of its name — as we can well afford to look at any picture which is pictorially good — this so-called "Nydia" is very charming — less strong in character, less individual, less definite than some of her predecessors, and therefore, I think, less valuable and a less complete exhibition of Mr. Fuller's power, but charming in color, refined and graceful in idea, and full of a sort of dainty, juvenile, intangible charm which art can very rarely fix on canvas. It is curious to see how thoroughly American in type she is, in spite of Mr. Fuller's intended choice of so different a theme. The etherealized, yet unmistakable American accent of all his work is a quality, I think, that has not been generally enough acknowledged. To me it is one of the most delightful and most valuable factors in his art.

The highest vote of the committee on receptions, and therefore the chief place of honor, were given to Mr. Dewing's "Prelude" — another work, it seems to me, which would have been better with another title, or without one altogether. It is a lovely picture in its way — which is rather the way of decorative than of strictly representative work — and seems to have gained Mr. Dewing the wide popularity which was not secured by his poetic and original picture called "Morning" which was shown at the Academy three or four years ago, and excited so much discussion at the moment. Yet to me that had certain good qualities which the new work is without, superior though this is in very many ways. There was a sort of severe dignity of feeling, of originality of mood, about the "Morning," which one does not find in the "Prelude." The gain is in the way of sensuous beauty — beauty of type, of handling, and especially of color — and here it is very great. The composition shows two girls in classic draperies, sitting on low stools with their harps beside them, and relieved against a background of trellised roses. In idea and sentiment it is closely akin, perhaps, to certain English pictures — for example, to those of Mr. Albert Moore, but I have seen very few English pictures of any kind that were so well painted. It is a delicate sort of French *technique* applied to the most delicate phase of English fancy. The faces are more lovely and less morbid than in English work, and the color more refined and subtile. The color, indeed, in its own way, could hardly be surpassed — as a soft yet glowing decorative harmony of soft pinks and yellows. One dress is dull pink, the other dull yellow of a peculiar shade, and the background an almost unbroken mass of wall of pale-hued roses — arranged, as I have hinted, in a decorative and not a natural growth, and veiled in one place by the faint smoke rising from a censer. The manipulation, both of the faces and the accessories, is extremely good, well worked out, but very fresh and free, and the harmony between execution and idea is unusually perfect. Mr. Dewing is to be congratulated on the success he has made, and the public upon the fact that it has at last awakened to his talents. Here is a brush which some one, ambitious of fine and delicate mural decoration in his home, might employ to great advantage. When we see such work as this, and remember how much of our household decoration is still imported — often in shapes which, while pictorially good, are not *decorative* in the least — we feel more strongly than ever that the future of American art depends to-day more upon the temper and the insight of its patrons than upon the endowments of its votaries. Mr. Lathrop's design for a frieze for a Boston theatre is, however, not very encouraging. It shows a long line of very conventional little elves, too lusty in form for grace, too coppery in color for beauty. There is good work in it, but not a particle of the two factors which are so essential in decoration — freshness of fancy and charm of color.

Mr. Ulrich, a young student recently home from Munich, shows work which is quite antipodal to that which is usually thought characteristic of the Bavarian school. Most of us forget that there is, to-day, in Munich, a band of *genre* painters whose work is as carefully realistic as that of some of their brethren is bold and synthetic. Mr. Ulrich has studied with Leibl, though he shows no trace of this great painter's influence save in his devotion to matters of fact. His contribution is a small canvas called the "Carpenter," showing the artisan at work by his bench near an open window. It is a most remarkable little picture, not so much in its attention to detail, its accurate drawing, its clever rendering of textures and of character, as in the breadth and artistic harmony and feeling which have been preserved in spite of all the detail and the care. It is very conscientious work, yet we feel as though we degraded it by calling it so. A better word would be *loving* — for the most fervid painter of his own imaginings could not show more delight in his work than does Mr. Ulrich in his. And thus is enforced the useful lesson that not even the realistic delineation of a prosaic theme need be prosaic in its result, if only the painter has had feeling to start with, and the power of giving pictorial as well as photographic value to his result.

Mr. Brush, who promised such great things with his large picture of "Miggles" some years ago, but has not been often seen since that day, sends now two pictures which are generally unpopular, but are yet, it seems to me, of the greatest interest. One is of medium size, and shows the figure of an Indian on horseback. This is simply photographic work. The subject is deliberately and stiffly posed, and the landscape surroundings are not treated with any feeling or any skill of hand; but the drawing of man and horse is so good, the character of the head is so accurately given, and the effect of strong light is so truthfully rendered, that we are compelled to the decision that if it is not a fine picture it has yet many elements of strength, and many which may result in great artistic force at a future day. Mr. Brush's other canvas is much more interesting, however, and is a most curious little work. It shows a steep, snowy mountain-side, with a well-rendered sunset sky off to the spectator's left. Far up the mountain are the figures of several Indians and horses, and in the foreground a brave, mounted on the roughest of mustangs, who is leaping a chasm in the snow, while he brandishes a scalp above his head. Add the facts that the man is in war-paint of a bright mustard-yellow, and that the horse is rather sharply foreshortened, and it will be seen that the picture is eccentric, if nothing more. But it is a good deal more. It is nice in color, in spite of its oddity, good in the delicate way the distance of the snow-clad slope has been rendered, with scarcely a gradation of tone, and in drawing perhaps the most wonderful bit of work in the room. This is a picture which, in defiance of Rembrandt's dictum, one must "smell" if one would rightly see. It needs closer examination than most visitors, repelled by its oddity, seem to have bestowed, to reveal the really marvellous drawing of the thrown-back head, so perfect in form, so vivid in expression, in spite of its small size and difficult position. The rest of the figure, in its violent attitude, and the clumsy horse stretched for his wild leap, are equally well drawn. A third contribution from the same hand is a small sketch of a broad field of snow, very well rendered, which is only broken by a couple of Indian wigwams.

Mr. Dannat's "After the Mass," from the last Paris *Salon*, is a strongly, rapidly painted work, with a well arranged group of Spanish peasants in a café, the heads and attitudes being alike good in character. The picture suffers a little in one's estimation because Mr. Dannat shows very plainly that he is a pupil of Munkácsy's, and that he is not his equal. This last were too much to expect even from so clever a young painter; and it were also a little too much, perhaps, to expect that *any* young painter immediately under Munkácsy's influence could avoid showing signs of it in his work. But so clever is this one that we may believe the present is only a passing phase, and that, his lessons over, he will stand on his own feet and see with his own eyes. I may add in justice that there were few *genre* pictures of any kind at the *Salon* last summer which, with all criticisms made, were better than this.

Mr. Birge Harrison sends a figure of a girl after her "First Communion," picking flowers in a sunny field in her white dress and veil. It is not a beautiful work, but very truthful in its effects of light, with the difficult contrast of white and bright green well managed, and the character of the head well studied. Is it flippant to suggest that in view of the subject and of the density of the average human mind, it would have been well if Mr. Harrison, when turning an old frame to new uses, had obliterated the still legible title "*Un Rendezvous*" from the tablet at the bottom? The same artist also sends a good little interior, and Mr. Tracy, a young painter who has lately made himself a reputation by his portraits of dogs, a very nice interior where the action of the figures — a man and a dog — is well conceived. Mr. Carr sends a good study of a girl reading in an orchard; and Mr. Faxon a charming little picture of a nude yellow-haired child on the sea-shore, called "A Young Mariner." The type is northern, but the landscape and the coloring seem suggestive of Capri. Mr. Walter Gay sends a picture — not new — called the "Fencing Lesson," which has many bits of very good painting in it, but is rather spotty and wanting in harmony as a whole. Mr. Blashfield's "Minute-Men" was a good idea, and is well composed, but carried out in lifeless fashion, and with small success in the way of textures. Mr. Benoni Irwin's portrait group of chess-players is by no means up to his usual level. Mr. C. S. Reinhart, so long known as a clever illustrator (perhaps the best we have, — with Mr. Abbey), is turning his attention to painting, and sends a clever bit of realism in the shape of two old women, very ugly and very dirty, but very characteristic, playing cards in the chimney-corner. Mr. Trego, a young Philadelphian, and scholar of Mr. Eakins's, sends a picture called "Battery of Light Artillery," which was purchased last autumn by the Philadelphia Academy of Fine Arts. It is a very good thing, especially when one remembers the youth of the artist, still a pupil when it was completed. It is original in manner, in spite of the strong teacher he has had; well-composed and harmonious, though very neutral in color. The men and horses of the train, pulling through the mud under a heavy rain, are capably drawn, and full of action; and the atmosphere is air, and not gray paint, in spite of an unluminous quality; but in color and light the picture would probably have shown to greater advantage had it been framed in gold instead of in dull-gray metal. Mr. Chase's "Studio Interior" is not so perfect as some he has produced—not so fine in color, I think, nor so dexterously truthful in its rendering of textures. Mr. Freer's charming little nude study called "*Le Repos*" should not be omitted, but is it not almost time for our painters to give English titles to their works — now when it is fashionable for even caterers to print their bills of fare in English?

In still-life pictures the collection is not rich, but there are one or two of exquisite quality — such as Mr. Bunce's "Red Mullet," Mr. La Farge's "Fish," and Mr. Alden Weir's pale-hued, delicately yet strongly painted, and most refined and sparkling little group of flowers

and rare bric-à-brac. Work of this sort from Mr. Weir's hand shows all the aristocratic elegance of temper of the eighteenth-century painters, with more than their strength of hand; and it proves him a true colorist, though loving chiefly pale and evanescent tones.

In landscape there is much good work, and two canvases that are really remarkable. These are Mr. Donoho's "Marcellerie" which stood among the best of its kin at the last *Salon*, and Mr. Chase's view of the Hackensack River. The former is one of the rare instances when a painter has not put much sentiment into a landscape, has made it simply realistic, and yet charming and valuable as art. It is a large view of a beech wood, with no sky visible above the tall, white, sparsely-planted tree-trunks, the great mossy rocks, and the pale green of the foliage. The harmony of tone produced by these notes and the dead leaves with which the ground is covered is very charming; but the great virtue of the picture is its truthful, fresh, out-door flavor. It is not landscape art after the fashion of the elder French school, with its preponderance of sentiment and personal feelings. It is like a glimpse out of a window — as near the actual thing as art can manage, yet thoroughly artistic in effect. Mr. Chase's picture has also this out-door quality to perfection, but with more of sentiment, I think. It is a broad view of river and meadow, with stunted trees on the bank and a town in the far distance — a view that, unlike Mr. Donoho's, was prosaic in nature, and gains all its artistic interest from the way it has been rendered — with such happy choice in composition and such fine translation of the life and depth of the atmosphere. As a study of tone it is wonderfully perfect, yet this has not been an end, but a means. The flow of the water is beautifully given, and the whole landscape one of the freshest and most sincere, one of the most subtilely truthful, and one of the most dignified and serene things of the sort we have yet seen produced on this side of the water. It is interesting to note that it was entirely painted out of doors, and that its harmony in tone was learned from nature, and not elaborated according to some studio recipe. Mr. Ryder's two little works do not seem to me either so poetic or so original as his best, but they have a certain luminosity which is very charming, and, like all his works, they prove him an artist who paints for himself, and not for public applause. Mr. Hopkinson Smith sends a clever and charming, if shallow water-color, called "A Rainy Day;" Mr. Picknell a marine and a landscape which are below his former level — hard and metallic in color, and dry and painty in handling. Mr. Pierce's "Forest at Fontainebleau" is much better — good in every way, indeed; one of the three or four most satisfactory landscapes in the room. I have quite forgotten, however, Mr. Twachtman, whose work, less conspicuous because of its small size, must rank with the very best. He sends three pictures this year, one of them among the finest he has ever done — a small landscape, numbered 129, with water and thick foliage, and red roofs in the distance. As usual, it is very broad in treatment and low in tone. Some observers, I find, cannot understand what there is in it to make it seem to others one of the very best things of the year. But this is, I think, its individuality, its poetry of sentiment, its harmony of color and tone, and the way in which, unlike such work as Mr. Donoho's, it suggests far more than it describes. Mr. Allen, Mr. Bunce, Mr. Foxcroft Cole, Mr. Dewey, Mr. Gifford, Mr. Senat, Mr. Smillie, Mr. H. P. Smith, Mr. Shurtleff and Mr. Whittredge, send work of their average quality — and the names of some of these may show that the Society is certainly to-day wide enough in its sympathies to satisfy all sorts and conditions of men. Mr. Blum's little study of a Venetian street has all his old brilliancy, with more of definition; Mr. Kenyon Cox sends a clever little scene, which, again, it is like looking out of a window to gaze upon; Mr. Cranford, a new name, a nice study of a field with scrub-pines; Mr. Walter Palmer a good picture called "Noon," with the yellow grain and strongly accented sky he has sometimes given us before; and Mr. Murphy a simple out-door study of an old farm-house, more truthful, less fantastic than his former essays, but quite as original. And then I must come to an end with a picture by Mr. Inness, which is as worthy of all honor as the two with which I began my list of landscapes, but which attracts less immediate notice because we have so long known his power and expected its revelations. This is not one of his finest works, but like everything he does, is full of the very breath of nature and of personal sentiment as well. It is a simple view of a New Jersey field with a footbridge over a ditch in front, and an old man crossing it, and in the distance a railway train. Verily, art is a magician in such hands as this — not altering nature in any perceptible fashion, yet giving her a beauty and an interest that are not her own.

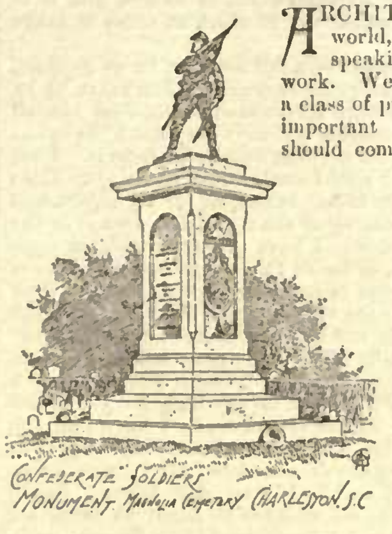
In sculpture there are but two things to be noted — Mr. Ezekiel's large bust of Liszt, good but rather commonplace; and Mr. Warner's bronze head of a young girl, very fine in character, and very subtile and perfect in its modelling.

On the whole, as I began by saying, the collection is a very good one — with some quite remarkable pictures, and a pleasing efficiency of accomplishment among the rank and file. Fortunately it is to go to Boston as a whole at the end of the New York Exhibition.

M. G. VAN RENSSELAER.

A REMINDER OF ANTE-BELLUM CUSTOMS. — The first colored carpenter ever seen working in Germantown is at present engaged on the alterations being made to the Opera-House by Tourison Bros., contractors. — *Philadelphia Press.*

A GRAVE ARCHITECTURAL GRIEVANCE.



ARCHITECTS, like the rest of the world, have to live; and, generally speaking, they have to live by hard work. We may add that they belong to a class of professions in which it is most important that money remuneration should come in a friendly, not an unfriendly way. The lawyer, for instance, is accustomed to be paid with groans and even execrations; the doctor knows that his fee is many a time put into its little envelope with a heavy sigh; but the architect ought always to feel that his shilling in the pound is considered to have been profitably bestowed, and that it truly represents the difference between a well-organized structure, the pride of its owner, and a mere pile of materials without form and void. In this view of the case those of our readers who have studied the anomalies of human nature may not be so much surprised as could be wished when we state the fact, that, if it pleases a client to be very shabby, the best of architects may find almost more difficulty in getting paid his due than the payment is worth. Nay, we have heard it declared that no client who is in himself sufficiently inaccessible to feelings of honor need ever pay his architect a pennypiece, provided he knows "how not to do it."

In plain language, the agency of an architect is, to the mind of an uninitiated person, so subtle in its nature, and, in the eye of an initiated person on mischief bent, so involved in intricate responsibilities, that there is no end to the repudiations, accusations, counter-claims, and miscellaneous artifices of attack and defence, which a fraudulent customer may be advised to rely upon, as means whereby to resist a just demand for architectural services: indeed, we may almost say there is hardly any restraint imposed upon the amount of exaggeration which it may be deemed expedient to indulge in; and, this being so, we need scarcely to go on to say that, when an unfortunate architect finds himself left to the tender mercies of litigation by a client who is avowedly merciless, his troubles are just as many and as great as his adversaries choose to make them, including not merely the loss of money and credit fairly earned, but the sacrifice of other cash and other character to any extent that accident may determine.

But this is not what we refer to under the title of "A grave architectural grievance;" it is vexatious enough in itself, but there is something still more vexatious which arises out of it. Our dishonest customer cannot play his game without allies, and it is indispensably necessary that he should be able to procure the aid of some other architect — probably of three or four other architects — who will show him or his solicitor (for a consideration) "the way not to do it" above referred to. Now, dog does not eat dog. Lawyers themselves are very chary of assailing each other. Medical men, with all their disagreements of doctrine, hang together honorably in personal matters. Even rival shopkeepers in back streets know the limits of decent rivalry. How, then, shall any one proceed who has to induce an architect to betray his brother?

The process adopted is always the same, and it is based upon a very peculiar characteristic of the architectural profession which we must explain. It is well known that architects have to do their work sometimes in the form of what is called *reports*. These reports are somewhat of the nature of counsel's opinions. A statement of facts, either in writing or not, is laid before an architect of presumed experience for his advice. A survey or inspection of the subject of dispute may be involved, as matter of course. Documents also are perhaps formally submitted. The architect thereupon considers the case, as he generally says, "carefully," and delivers an opinion upon it in the form of a "report," which is engrossed on foolscap, sometimes on "brief," in the elegant but severe handwriting of Chancery Lane, and with wide margins, all very stately and impressive, and wearing the aspect of a thing that is worth a handsome fee. The subject may be a builder's extras, the value of an acre of house property, the compensation claim of a greengrocer, a hundred and fifty competitive designs for a church or a town-hall, the inconography of a cathedral, the smell of a drain, the quality of a brick wall, the cause of a crack in it, and so on, not excluding a brother architect's charges or a brother architect's mode of transacting his business. Accordingly, when our shabby customer, or his solicitor, requires the aid of an architect, or of three or four architects, to bolster up his case, the trick is to request the favor of a report upon a certain statement, or misstatement, of facts. That is to say, he does not rush into the first architect's office he comes to and claim the protection of the just; neither does he send a brief to some well-known professional authority and retain him to be his advocate in the witness-box; the solicitor blandly intimates that he has a slight architectural misunderstanding on hand, respecting which he would be glad to have an opinion, and he therefore begs to be favored with a

call at earliest convenience. The whole tone of the application is as innocent as the purchase of sixpennyworth of sweets, and it is received in the same business-like way in which an order is taken for a new coat.

Thus it is that when an architect — a full member, let us suppose, of the Institute — finds a mischievous case against him taken up by a colleague with whom he has been accustomed to consider himself on the best of terms, the explanation is always very much the same: "I have no ill-will towards you, my dear fellow, far from it. I am very sorry to be against you, I would much rather be on your side; but a certain statement of facts is laid before me for my report, and — there you are! I know nothing of the rights and wrongs of the quarrel, and don't want to know. I have given my opinion upon what is a supposititious case, so far as I am concerned, and I leave it entirely to the parties to prove or disprove the facts; that is their business, not mine." Perhaps the victim of this insidious formalism may ask whether the witness will kindly consent to hear the other side; if so, the answer is equally glib: "My dear fellow, I am not the judge. I could not dare to interfere between you except as a regularly-appointed arbitrator; if I can do anything for you in *that* line I shall be most happy. In the meantime, as I have told you before, I have been asked for a report; whether that report is worth anything or nothing I really do not know; all I know is that I am subpœnaed, and—here I am!" If "my dear fellow" should then so far forget himself as to ask whether he might be permitted to see the report which is now so interesting to him, he may possibly be told that he certainly may if Mr. Solicitor has no objection; but whether Mr. Solicitor has ever been known to have no objection we are not able to say. At all events, the unfortunate litigant in due course of time sees his amiable friend in the witness-box; and inasmuch as every person who finds himself in the witness-box by virtue of a consideration of so many guineas to be paid—the disposition to pay being in some degree dependent upon the value of the evidence given—is laudably loyal to his retainer, and so far loyal also to *amour propre* that no man likes to be on the losing side if he can help it, we need scarcely say that the "report" is soon discovered to be more or less damaging, and generally more rather than less than might have been expected. What makes the matter worse is that the witness will offer to shake hands, after the battle is over, and, while pocketing his guineas at the expense of his defeated "dear fellow," will perhaps jovially rally that dejected combatant upon some want of generalship whereby the weak points of his evidence were not brought out as they ought to have been in cross-examination.

Now, all this is very painful to narrate as unexaggerated fact. Whether it may be the case that the solicitor in the first instance entraps the witness into the delivery of a report almost to dictation (as is sometimes alleged afterwards in shame); or that the architect of a certain class is in the habit of regarding a lawyer with so much awe that he is helpless in his hands; or that the temptation of a few guineas cannot be resisted; or that the titillation of the sense of self-importance is chiefly the motive impulse; or that all these influences alike, together with a *soupçon* of that enjoyment which human nature is said to derive from the misfortune of one's friends, generally combine to make a weak man do an unbrotherly act; certain it is that in perhaps no other profession in England would such unbrotherly behavior be possible, and almost still more certain that in no great guild like the Royal Institute of British Architects would it be tolerated. We may remark that even amongst architects themselves it is known by the ugly name of *Cannibalism*.

If we be asked to make a definite proposal upon the subject, we are prepared to submit that in no case of a *personal* nature ought any member of the Institute to report adversely upon any matter of a colleague's business until after hearing his explanations. If lawyers of the less scrupulous sort should object to this on some technical ground of their own, so much the worse for their law; upon the practical ground of honest fair play between brethren it seems to us that no one could possibly object to it. We have purposely avoided setting forth the particular artifices of assault which a litigating architect has so much to fear; we have contented ourselves with stating that they cannot be put in force with any effect without treacherous aid from within the pale; our further proposition simply is that the authorities of the pale are responsible for the permission of the treachery, or where is their authority? —*The Architect.*

The Longest and Highest Bridges of the World. — The longest viaduct in the world built of stone is that which connects Venice with the mainland. Its length is 3,598 mètres, or about two miles and a quarter. The longest iron bridges in the world are the following: — Parkersburg Bridge, 2,147 metres, or one mile and a third; St. Louis Bridge over the Missouri, 1,993 metres, or about a mile and a quarter; the bridge over the Ohio at Louisville, 1,615 metres, or about a mile; East River Bridge, New York; Delaware Bridge, Philadelphia, and the Victoria Bridge at Montreal, all these about fifteen hundred metres; the Volga Bridge at Sysran, 1,485 metres; and the Moerdyk Bridge in Holland, 1,479 metres; the five latter all being rather under a mile. The loftiest bridge is in France. It is the Garabit iron bridge in the department of Cantal, but will not be ready for opening till next year. It stands at such a height that the Vendôme Column on the top of the Cathedral of Notre Dame could stand under it, its height above the valley being 124 metres, or 406 feet. This is 72 feet higher than the Kinzua Viaduct in America. — *The Builder.*

WATER-CLOSETS. — XI.

Findon's Pan-Closet. — In 1836, James Findon, an Englishman, invented a combination of levers and arms for opening a pan-closet. The pan is held in position by a long, weighted lever. A rod, which was connected with the lever near the weight was also joined to a short lever that was attached to the pan. These arms and levers were so connected as to revolve freely for a certain distance on their joints, while the short arm or lever was connected rigidly with the pan. The spindle formed a fulcrum on which the pan would be balanced by the lever.

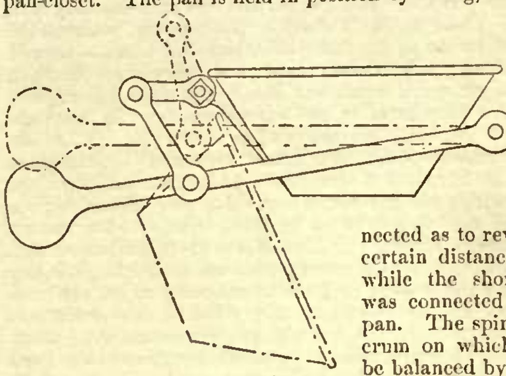


Fig. 106. — Findon's Pan-Closet.

Havard's Closet. — In France the use of this class of closet seems to have been general. Among other French closets I note one invented in 1840 by Havard. This closet received a medal at the Universal Exposition held in Paris in 1855. In this closet motion is imparted to the pan by means of a rack and mutilated pinion or toothed quadrant. The axis of one of the quadrants is the spindle on which the pan turns. Any pressure on the seat would cause the rack to partially revolve the quadrant that was connected with the pan. In this manner the pan would be opened whenever there was pressure on the seat. This closet was intended for use in public places, and Liger tells us that in 1875 it was still used in public places in Paris.

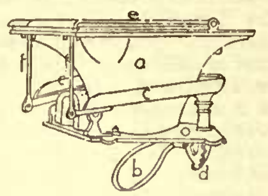


Fig. 107. — Perspective.

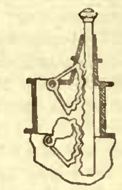


Fig. 108. Section showing working parts.

Havard's Closet.

a, Bowl. *b*, Pan. *c*, Levers connected with rack. *d*, Toothed quadrant. *f*, Connecting-rods. *e*, Foot-rest.

Guinier's Pan-Closet.—Guinier, a manufacturer of plumbers' supplies in Paris, in 1840 invented a closet which I illustrate as an example of a large receiver, and a complicated arrangement for accomplishing a simple movement. I must refer to the illustration to explain the manner of opening the pan. The pull-rod, levers, arms, connecting-rods, and a large, slotted shoe-shaped arrangement are all concealed in the receiver. The pull-rod passes through a stuffing-box. It will be readily seen that this machinery could not be repaired without taking the closet to pieces, and also that it would be liable to fail in a short time. Any arrangement of this kind would afford excellent opportunity for the accumulation of filth on the different pieces of machinery. There seems to be no effort made in any of the French closets to ventilate the receiver.

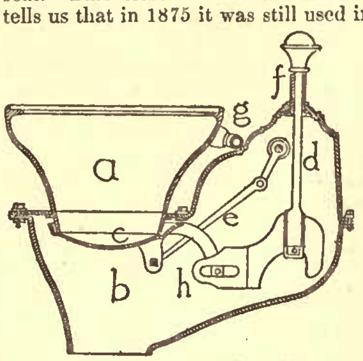


Fig. 109. — Guinier's Pan-Closet.

a, Bowl. *b*, Receiver. *c*, Pan. *d*, Pull-rod. *e*, Connecting-rods. *f*, Stuffing-box. *g*, Supply-pipe. *h*, Slotted-shoe.

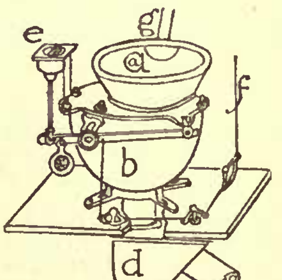


Fig. 110. — Perspective.

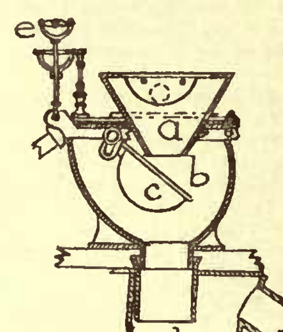


Fig. 111. — Section.

Common English Pan-Closet.

a, Bowl. *b*, Receiver. *c*, Pan. *d*, D-Trap. *e*, Hand-pull. *f*, Wires and bell-crank connecting with cistern. *g*, Supply-pipe.

Common English Pan-Closet. — Baldwin Latham [1] describes and illustrates as types of pan-closets which had been in common use, and

[1] *Sanitary Engineering.* Sewerage, London: 1873.

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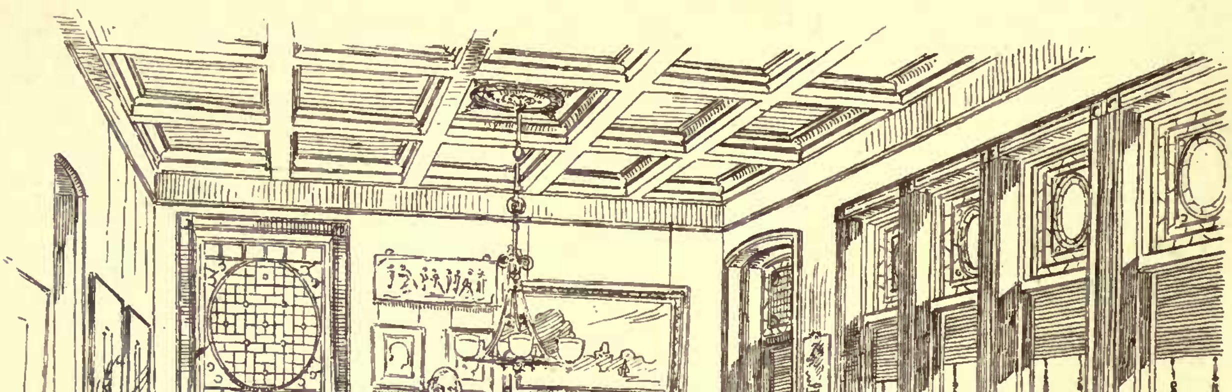
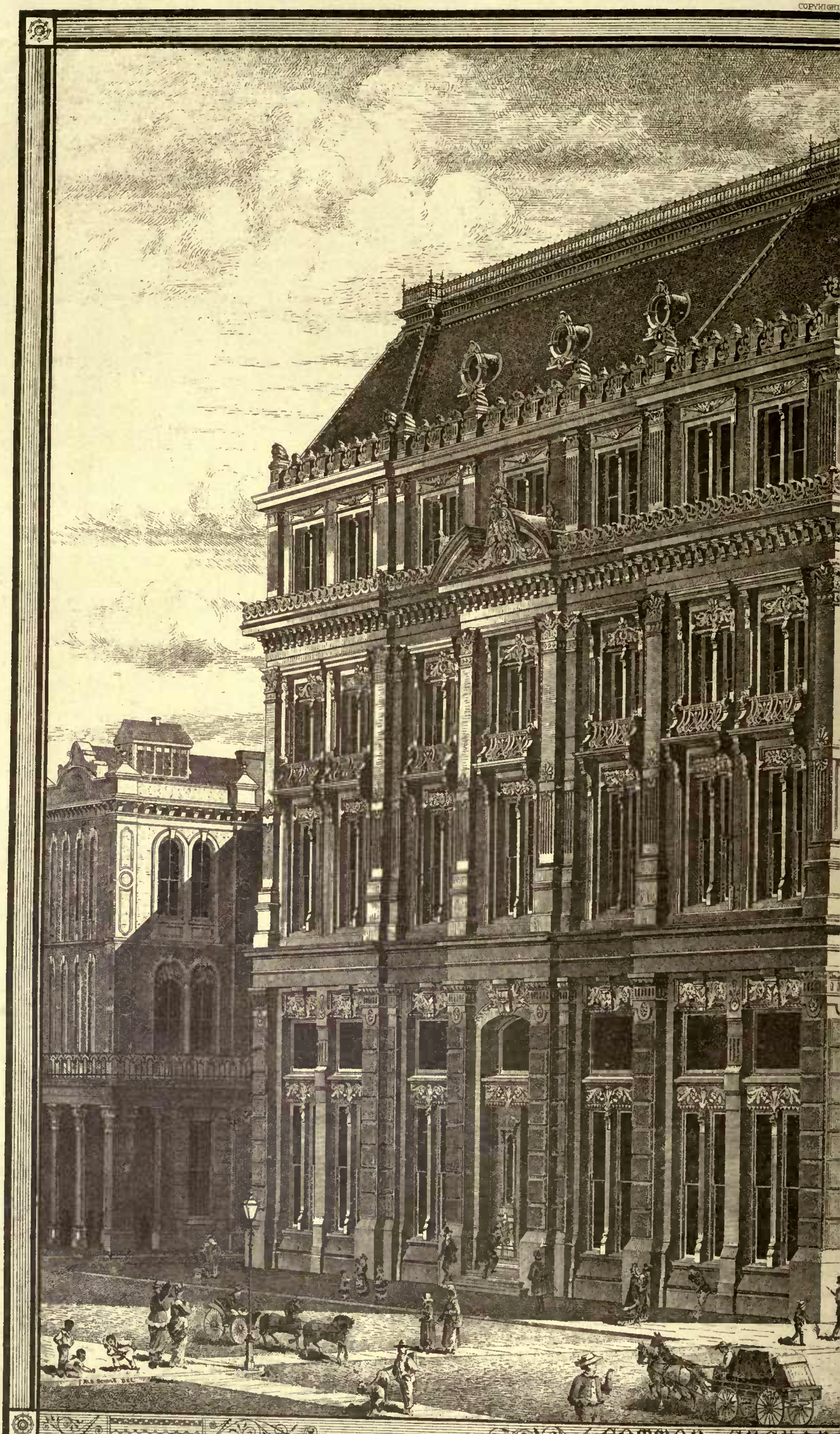
The Ladies' Study.

Jacob Sleeper Hall.
Boston University.



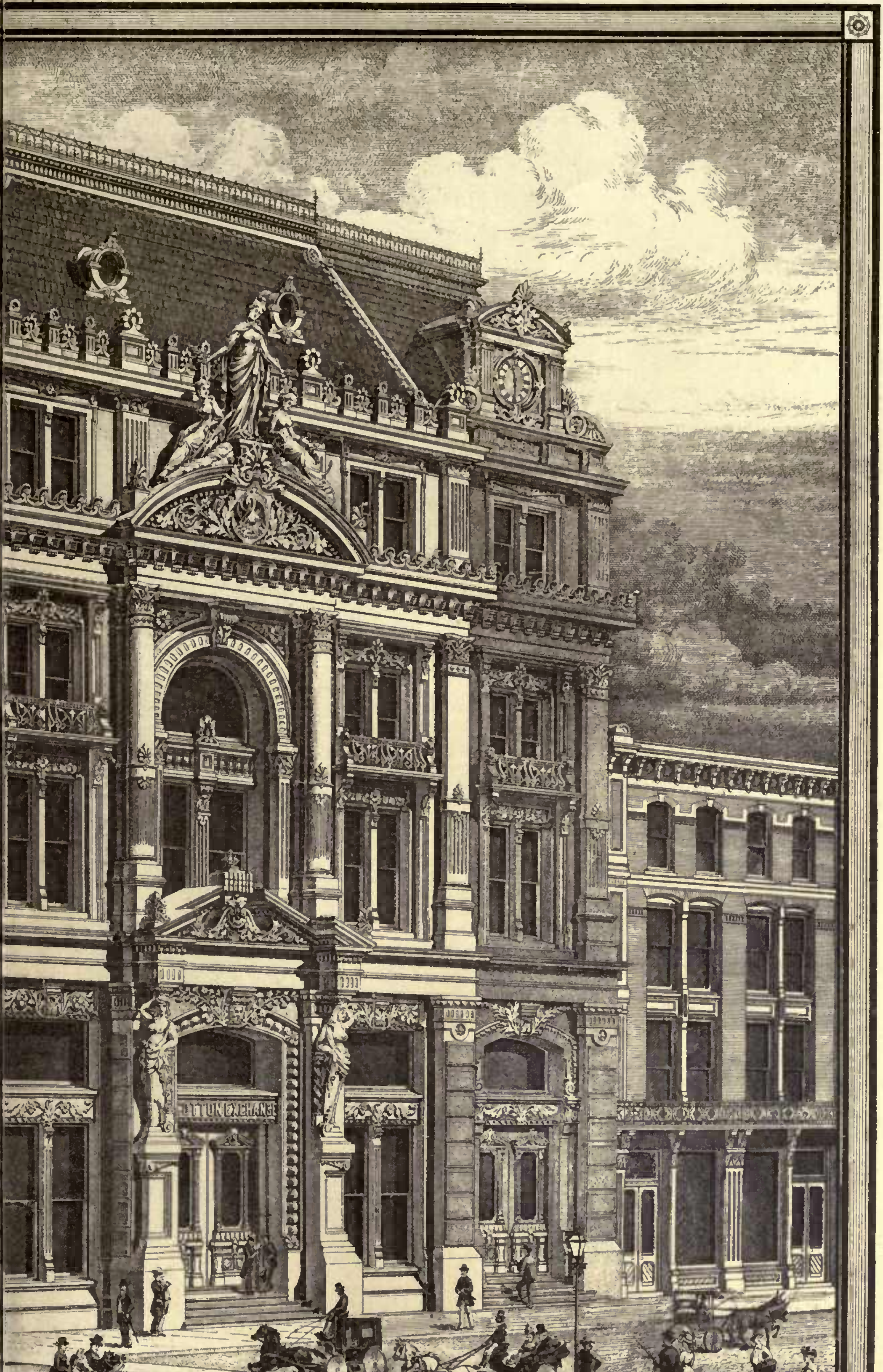
The Young Mens' Study.

Heliotype Printing Co. Boston



COTTON EXCHAN

Jas. R. Osgood & Co.



NEW ORLEANS. H. Wolters Architect. Louisville Ky.

Heliotype Printing Co. 211 Tremont St Boston.

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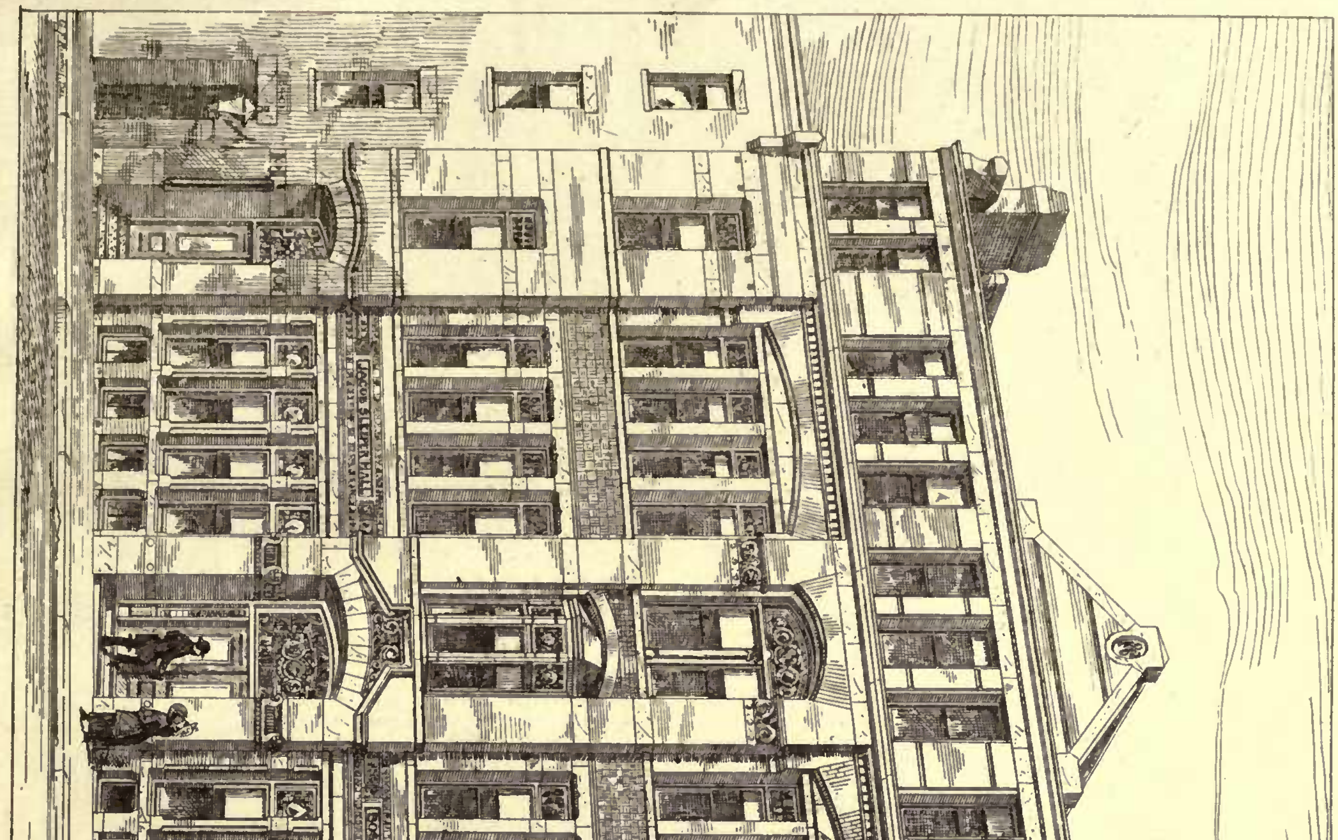


JACOB SLEEPER HALL

Heliotype Printing Co. 211 Tremont St. Boston

were still used in England in 1873, the closet of which the following is a description: —

In this closet are shown some of the worst features of the pan-closet. The bowl is conical in shape, fitting into a hole in the top of the receiver. The bowl is held in position by a projecting rim, moulded around it about half-way between the top and bottom; between this rim and the top of the receiver a layer of putty is usually placed. I have never seen a joint formed in this manner between the bowl and the receiver in which the joint was perfect unless it had just been made. The least pressure against the bowl or receiver, a jarring of the floor or supply-pipe, may cause the joint to open. The putty is generally full of cracks, the cracks containing putrid urine and other foul matter. It can be easily seen that all foul gases generated in the receiver can come directly into the room when this joint is imperfect. The pan is moved in the usual manner by a spindle that has a slotted crank on one end connected with the hand-pull by a weighted lever. In the perspective sketch the mode of connecting the hand-pull with the cistern or tank by means of bell-cranks and wires is clearly shown. The usual receiver is shown in connection with a D-trap, both of which act as receptacles for the excrementitious matter passing through them. In these receptacles the waste matter lodges, remains, decays, and generates gases, and most probably liberates germs far more deleterious than would usually come from a well-ventilated sewer or drain.

The closets described in the following pages are manufactured at the present day by prominent manufacturers of plumbers' supplies. Patents, when claimed on them, are usually for some novelty in the position or form of the supply-valve, or the weighted lever. As these parts might be with equal facility, with some exception, attached to a valve-closet, they cannot be put down as distinct features in the class which is under discussion.

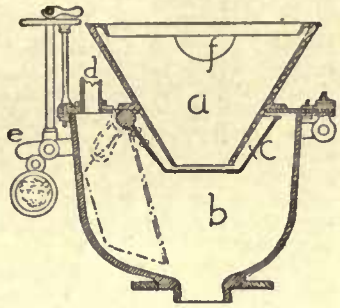


Fig. 112. — Hellyer's Pan-Closet.

a, Bowl. *b*, Receiver. *c*, Pan. *d*, Vent. *e*, Weighted Lever. *f*, Fan.

Hellyer's Pan-Closet. — Although Hellyer[1] condemns the pan-closet in very strong terms in both his works on plumbing, he finds it a commercial necessity to manufacture them to supply the demand. This closet is similar to the one described above, except the vent-pipe, which is inserted into the top of the receiver. In this illustration is shown the usual manner of setting the bowl on the receiver, and the way in which it dips into the pan and forms a water-seal. This closet has a combination of the old-fashioned fan with a small flushing-rim for spreading the water around the bowl. The vent-pipe is screwed into the top of the receiver back of the pan, where most of the filth accumulates.

Doulton Pan-Closet. — The Doulton Company manufacture a pan-closet that has an ample vent-pipe which enters the receiver on the side near the bottom. This closet has a stoneware container, of which the manufacturer says: "and thereby is obviated the hitherto great objection to this closet, from the container, when of iron, becoming encrusted with soil and emitting impure gases." This container has a white glaze inside.

Cazaubon's Closet. — F. Liger illustrates a closet invented by Cazaubon. In this closet the pan is moved by a short arm or lever, which moves up and down on a fixed axis. The end of the lever, where it comes in contact with the pan, has a semi-spherical button. The pan is hinged, and when it opens, the end of the lever slides

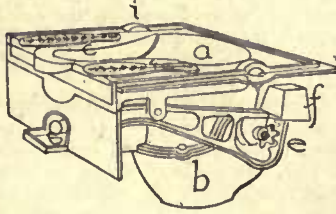


Fig. 113. — Perspective.

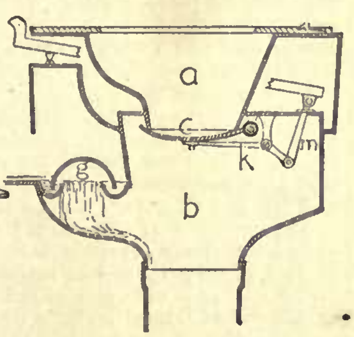


Fig. 114. — Section.

Cazaubon's Pan-Closet.

a, Bowl. *b*, Container. *c*, Pan. *e*, Cogs on lever. *f*, Weight on lever. *g*, Overflow. *i*, Journals. *k*, Short lever or finger. *m*, Connecting-rod.

along the bottom of the pan. The principle is very much like the one adopted by Mott in the Demarest valve-closets. The perspective shows an arrangement for opening the pan by pressure on the seat, or, more properly speaking, the stand, as the seat is arranged after the Oriental manner. The stand in this instance rests on two journals, and is connected with a lever, on the short arm of which is a rack. The rack imparts motion to a mutilated pinion, which, partially revolving on its centre, moves the short lever or finger that opens and shuts the pan.

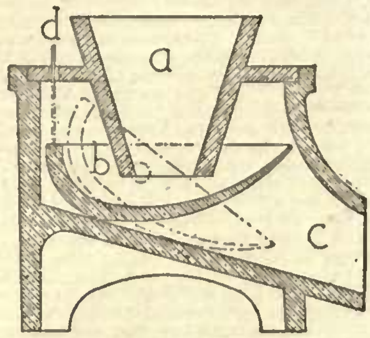


Fig. 115. — Jones's Pan-Closet.

a, Bowl. *b*, Pan. *c*, Receiver. *d*, Rod for holding pan in position.

Jones's Closet. — In the year 1860 a patent was issued in England to one Jones, for a tilting-pan very similar to the flushing-tanks now in use, which tilt when the water has attained a certain height. The pan was held in a level position by a small rod, which had a bearing on the rim at the back part of the pan. By raising this rod or hand-pull, the weight in the portion of the pan in front of the journals, on which it was balanced, would cause it to tilt and empty its contents into the receiver.

[1] *The Plumber and Sanitary Houses.* S. S. Hellyer, London: 1880. *The Art and Science of Sanitary Plumbing.* S. S. Hellyer, London: 1882.

THE ILLUSTRATIONS.

THE JACOB SLEEPER HALL, BOSTON UNIVERSITY, BOSTON, MASS. MR. W. G. PRESTON, ARCHITECT, BOSTON, MASS.

COTTON EXCHANGE, NEW ORLEANS, LA. MR. H. WOLTERS, ARCHITECT, LOUISVILLE, KY.

THE BRADFORD CHIMNEY DISASTER.

LIEUT.-COL. SEDDON, R. E., has sent in his report to the Home Secretary on the causes of the fall of the Newlands Mill Chimney, Bradford. The report, which is printed *in extenso* in the *Bradford Observer* of the 14th inst., entirely confirms the conclusions at which we arrived, and to which we gave expression, at the termination of the inquest on the bodies of the fifty-four unfortunate operatives who were killed by the disaster.[2] After describing in detail the foundation and construction of the chimney, and the attempts to straighten it, Col. Seddon recounts the circumstances attending the subsequent history and fall of the chimney, and in conclusion makes the following remarks on the causes of its failure: —

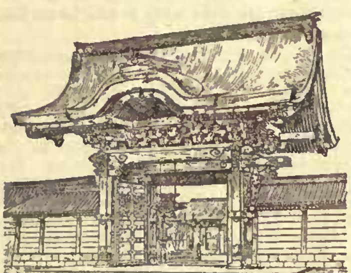
"The failure of this chimney was undoubtedly due to the damage done to the structure in the operation of straightening. The only wonder is that it survived that operation for twenty years. One cut would have been serious enough, but the second was fatal to the slice of masonry between the two cuts. The weight of the shaft above, at least 2,200 tons, giving a uniform pressure of 7 tons per foot super., rocking in every wind on this weak spot, slowly but surely disintegrating the masonry; the loose rubble backing, in yielding, threw the weight on the damaged outer casing and the inner brick lining, which latter stood on two independent single-brick cylinders, 30 feet high, the inner one of fire-brick exposed to all the heat of the ascending gases, and the other of red brick laid without any stretchers, at any rate for the greater part of its height. The leaning of a chimney and cracks in the shaft would not be sufficient of themselves to cause any apprehensions of immediate danger in a district where the majority of the chimneys are more or less cracked and many are considerably out of plumb, but, as it happened, those who examined this chimney were misled by a knowledge of its previous history into thinking that the rapid development of the cracks and bulges were merely due to the vibration of the chimney in the wind loosening the old portions of the outer casing which had been built up after the straightening without being tied into the backing, and which had again become loose and undergone similar repairs about sixteen years before. The chimney was in reality daily resting more and more on its outer skin, to remove which, as decided, was no doubt a fatal error. Before, however, this could be done, piece after piece of the outer shell was pinched out, and the rocking of the shaft in the wind on the Wednesday night and Thursday morning completed the destruction of the chimney. A heavy gust came, and the damaged backing, having lost the little tie previously afforded by the outer casing, burst out, and all was over. It is easy to be wise after gaining experience, but the history of this chimney is so exceptional that I doubt if any one would have anticipated any immediate danger. The cutting straight of brick chimneys is an operation of common occurrence, but I am not aware of any stone chimney, except this one and another close by, belonging to Messrs. Sugden & Briggs's works, having been so treated. I unhesitatingly say that it was an operation which ought never to have been

[2] See *Builder*, p. 163, *ante*.

performed. The design of the chimney was radically bad in almost every particular, and although the actual cause of its falling when it did was the damage done to it in straightening, I feel certain that even without that operation it could only have had a limited life, and unless taken down in time, it would certainly have fallen some day or other. The system of constructing chimneys or any other walls to carry heavy weights, of three or four different parts, each too weak in itself, and yet so put together that they cannot possibly work in unison, cannot be too strongly condemned; whilst the necessity in large chimneys for the fire-brick lining being perfectly independent of the structural part of the shaft is now universally recognized. The fall of this chimney ought to be a warning in future to any one who, dispensing with proper professional advice, takes upon himself the responsibility of carrying out works upon the safety of which the lives of so many may depend. Here we have a self-constituted architect and engineer, with a thoroughly bad design to begin with, for an 85-yard chimney, in which the uniformly distributed pressure at the base of the shaft would amount to over nine tons per foot super., first deciding, after getting about 10 yards above the ground-line, to carry the shaft up to 100 yards instead of 85 yards, with the idea of making it look lighter (this was abandoned after the failure at 70 yards); and next weakening the structure considerably by inserting recessed panels all the way up to ornament the face, and that in spite of the advice of his builder to the contrary. It may not be out of place here to point out that there is a limit to the useful height of a chimney as regards draught; whilst the increase of draught due to increase of height is frequently more than counterbalanced by the losses due to sudden changes of direction in the underground flues, and their want of gradual easing into the chimney, as well as by the unnecessary admission of cold air into the interior of the chimney. Looking to the possibility of there being other factory chimneys in a dangerous condition, as well as to the evidence of the Bradford Borough Surveyor as to the difficulty of getting to know of such cases, whilst he has no power to inspect such structures without some grounds to go upon, it is worthy of consideration whether the factory inspectors might not be empowered to make inquiries on this subject, and to report any cases which may come to their knowledge."

We have received from Mr. John Waugh, C. E., of Bradford, an interesting and concisely-written report on the subject, illustrated with plans and sections. Mr. Waugh, it will be remembered, assisted Col. Seddon in his investigations. Mr. Waugh's report is addressed to the Directors of the Yorkshire Boiler-Insurance and Steam Users' Company, to whom he is engineer, and although primarily written for the benefit of steam-users (all steam-boiler owners being more or less interested in chimney construction), it is likely to prove useful and instructive to a wider circle of readers. Mr. Waugh, whose report is in agreement with that presented by Col. Seddon, concludes by making the suggestion that all "suspicious-looking" chimneys should be inspected *internally* once in every two years. Had the Bradford chimney been so inspected, say a twelvemonth before its fall, its internal condition, as revealed after its fall, "would have put another construction upon the mistaken opinion as to the cause of the cracks in the outside casing, — an opinion only based upon outside inspection, and prevailing, unfortunately, even up to the day of the falling of the chimney." — *The Builder.*

THE DECORATIVE TREATMENT OF METALS IN ARCHITECTURE. — I.



EAST GATEWAY OF THE TEMPLE NISHI-HONGWAN-JI, KIOTO.

THE first of a course of three Cantor lectures on this subject was given at the Society of Arts' room on Monday evening, by Mr. Geo. H. Birch, A. R. I. B. A. Having explained that he should treat his subject from an art, and not from a constructional point of view, the lecturer alluded to the immense importance of the metals to man, asking the audience to transport themselves in imagination to the primitive ages, when metallic currency was not, and consider to what straits they would be reduced when chipping the primeval flint or scraping the pre-historic bone. Co-existent with the first germs of civilization, the use of the metals had expanded with its growth, and, from the cradle to the grave, man was absolutely dependent upon the metals for existence. Numberless generations had passed away, but the metals which they fashioned for use or adornment might still exist, albeit melted, remelted and reformed, divided and dispersed infinitesimally, and might continue in existence for countless ages to come.

Architecture had been well defined by Reichensperger as an "aggregate of various beautiful arts, working principally by means of proportion." Of these arts sculpture and painting took the first rank, but other accessories were employed to enhance the beauties of the building. The more successful would a building be, and the more satisfying and pleasant to the eye, when the subsidiary arts were kept in due subordination to the leading architectural features, and introduced to accentuate rather than destroy their harmony of proportion. In all styles these subsidiary arts must be admitted as necessary, for architecture without them would be cold and lifeless. The employment of the metals to enhance architecture was of equal antiquity with sculpture and painting; indeed, there was scarcely a style of architecture now known to us, from the description of ancient authors or modern research, in which we did not find this use of the metals more or less apparent.

Taking up, in the first place, the employment of the precious metals, gold and silver, in this connection we found in Egyptian hieroglyphics many references to their use. The *stèle* of Hatharsa of the twelfth dynasty stated that he compelled chiefs "to wash gold," and on the tablet of Nebuain, in the reign of Thothmes III, we read that, as high priest of Osiris, "I dedicated numerous works in the house of my father, Osiris, of silver and gold. . . . I was called to the house of gold. . . . I made to thee a secret chapel of stone, the bolts on it of brass covered with gold." And in other passages of the same record we were informed that the folding-doors and the tablets of the temple of Khonsa, in Thebes, were plated with gold, and that the hinges of the gates were of silver, with coverings of gold, while the columns, the cornices and lintels of other temples were referred to as of sandstone, plated with pure gold. Egyptian architecture at the present day showed little trace of any metallic adornment, nor was its use at any time so prevalent there as with the Assyrian, Chaldæan, Babylonian, Medo-Persian, and other Semitic races. Gilding was applied by the Egyptians, not as by us, in sheets beaten to an infinitesimal density, but in strips of considerable thickness, as might be seen by an inspection of some of the mummy-cases in the British Museum and the Louvre. In Egypt, sculpture and painting were profusely employed, to the exclusion of other forms of decoration; but many of the obelisks were decorated with gold, both the pyramidon and base being gilded, and they were often surmounted by a disc of gold. The gold-mines of Midian were extensively worked by the Egyptians. Captain Burton discovered the cartouche of Rameses III in some of the disused workings, and the cartouche of a much earlier King Kheperteara in the Sinaitic peninsula.

The great Assyrian empire was remarkable for its use of the precious metals as architectural adornments. Herodotus told us that the temple built by Nebuchadnezzar at Borsuppa consisted of several stories, diminishing in size, the outer walls of two of these stages being covered with gold and silver respectively; and that at Agbatana, the capital of the Medo-Persian empire, the king's palace had wooden beams, ceilings and pillars covered with plates of gold and silver, and was roofed with silver tiles, and the latter statement was confirmed by Polybius. The temple at Babylon, called by Herodotus that of Jupiter Belus, was also said to be richly decorated with gold.

In the case of the contemporary kingdom of Israel, we knew from the Bible the extensive use made by that purely Semitic race of the precious metals; it being recorded that in the days of Solomon gold was nothing accounted of, and silver in Jerusalem was as the stones of the streets. Even from the time when the children of Israel were journeying in the wilderness they employed the precious metals "borrowed" from the Egyptians in making the sockets, rings, and capitals of the Tabernacle, the columns being overlaid with pure gold — possibly a hyperbolical way of describing plain gilding — and the candle-stick, lamps, and altar of incense being of pure gold. Four hundred and eighty years afterwards a wonderful temple was built by Solomon, of which the chief adornments were metallic. Indeed, one modern manufacturer had gravely attempted to prove that the temple was entirely made of metal, and that no stone was used except for the foundations, basing his belief on the well-known verse (I Kings, vi. 7) which stated that there was neither hammer nor axe, nor any tool of iron heard in the house while it was building, so that all the parts must have been put together with screws! One might with equal reason start the theory that it was entirely of cedar or other wood, and quote the same chapter as an authority, "as there was no stone seen." Josephus's description of the Temple, although mainly derived from the First Book of Kings, was interesting, as it was interwoven with other traditions; and after allowing for the unintentional love of hyperbole natural to Oriental nations, it was seen that this Temple must have been resplendent with the precious metals, and an object of admiration, wonder, and cupidity to other nations. The description of Solomon's palace having roof and walls adorned with gold, gave an accurate idea of those palaces unearthed by Layard at Nineveh and Khorsabad, even to the sculptured lining slabs and ivory thrones. In the Biblical account mention was made of Hiram, King of Tyre, who assisted Solomon, especially in making the metal ornaments for which the Jews seemed to have had little aptitude, and from Menander we learned that Hiram also dedicated a golden pillar in the temple of Jupiter at Tyre, and rebuilt the temples of Hercules and Astarte.

The lecturer next referred to the poems of Homer, written apparently about eleven centuries before the Christian era. Homer described, in language almost sublime, various palaces and halls, such as those he must have seen or heard of, and while affording no idea of their architectural style, he dwelt much upon the golden doors and the silver ornaments, graphically portraying such a wealth of metallic splendor that, to borrow a phrase of his own, his descriptions "poured along like a fire that swept the whole earth before it." In illustration of this vivid imagery, Mr. Birch quoted from Pope's version the well-known descriptions of the Palace of Alcinoüs, and the Hall of Menelaus in Sparta. Doubts had been thrown on the existence of the Homeric heroes, but Dr. Schliemann's discoveries at Mycenæ, Orchomenos, and Hissarlik, of tombs containing immense stores of gold buried with ancient warriors, was striking testimony in confirmation of the poet's story. In a lesser degree we found the same in the tombs of the primitive inhabitants of Italy, the Etruscans, pointing to a common origin, perhaps Pelasgic. Turning back to Greece, we were tempted to ask, as we gazed upon the ruins of the Parthenon or the Athenian Acropolis, could there

possibly have been room for any decoration in this temple beyond the perfect symmetry of its own faultless proportion? The answer must be in the affirmative. Not only was color applied, as we saw, beyond power of dispute, in the sculptures by Phidias, now in the British Museum, but metallic decoration also lent its aid in adding to a beauty almost perfect in itself. On the Parthenon were still visible the holes for clamps in the architrave, and circular stains upon the marble, showing that under each of the metopes was suspended a gilded shield, and smaller holes under the triglyphs indicated that inscriptions in gilded letters formerly existed between each. These had been supposed to indicate the votive offerings of shields taken by Alexander from the Persians, and given by him to the Parthenon; but the lecturer believed they formed part of the original design. The acroteria which decorated the mounts and corners of the pediments were also of gilded metal, and the railings or grilles between the columns and the antæ were likewise gilded. Passing within, the most prominent object was the chryselephantine statue by Phidias, in which the glittering golden raiment and crested helm contrasted with the soft creamy beauty of ivory flesh. We knew that the Temples of Jupiter at Olympia, and of Apollo at Delphi were also full to overflowing with the votive offerings of generations. The inner sanctuary of Herod's Temple at Jerusalem was decorated with a golden vine; indeed, so immense was the quantity of gold in this Temple that after the destruction of Jerusalem gold was sold in Syria, by the soldiers of Titus, for half its value.

Passing on to Imperial Rome, one was almost bewildered by the many examples of the employment of the precious metals in the adornment of its edifices, such as the Golden House of Nero, the gilded Capitol, the Temple of Ceres, and the gilded statues and trophies of the Ulphian Basilica. In the New Rome, on the banks of the Bosphorus, the same traditions as to the use of the precious metals were maintained. The church of St. Sophia must, in the days of its first magnificence, have been refulgent with the precious metals; apart from the universal use of gold and silver mosaics in its dome and vaults, the columns of the ciborium and the baldacchino over the altar were formed of silver-gilt; the sculptured lilies and fruits which adorned it, and the cross which surmounted it, were of solid gold; and of gold were also the solea and ambones. At the Church of the Resurrection, in the same city, the under side of its wooden vault was covered with plates of gold by Basil, the Macedonian. In the Church of St. Demetrius, at Thessalonica, A.D. 458, there was a ciborium of silver, and the shrine of the saint was hexagonal; both the six columns and the walls being of silver, covered with incised ornament, and the circular cover and the sphere and cross above were also of silver. This seemed to have been the prototype of many of the gorgeous shrines of Mediæval churches. The three immense basilicas at Rome:— St. Peter, St. John Lateran, and St. Paul-without-the-Walls, were rich in the precious metals. In some of the Italian churches, and also in Spain and Germany, were still preserved magnificent altar-pieces of silver-gilt, called *pala d'oro*.

In St. Mark's, Venice, was a superb specimen which was uncovered on great festivals; it was of Byzantine workmanship, and richly jewelled; it was made in 976 by order of the Doge Pietro Orseolo, but was much altered by successive Doges. St. Ambrose's Church, Milan, possessed one of the richest in Christendom, and slightly earlier (A.D. 835) than the Venetian one. The front was of gold, and the sides and back of silver; it was richly enamelled and set with jewels. The name of the artist had been preserved, Wolvernius. In the Duomo at Monza, was an altar-frontal silver-gilt, of the tenth century, and at Citta di Castello, a silver altar-piece of the twelfth century. A magnificent *pala d'oro*, formerly in the Cathedral of Bâle, now formed one of the chief treasures of the museum at the Hôtel Cluny, Paris. It was given to the cathedral by the Emperor, Henry III, about the commencement of the eleventh century, and, although betraying Greek influence, was probably of Lombardic, and not Byzantine, workmanship. It was of solid gold, on a foundation of cedar, and was remarkable for the lifelike energy of the figures in high relief, and exquisite workmanship of the foliage, animals, and filigree enrichments. The tomb of St. Margaret, in the church of the same name at Cortona, was of the thirteenth century, and had a silver front. At Florence, in the Opera del Duomo, was preserved a silver retable beautifully enamelled; it was five feet high, fifteen feet long, and was divided into twelve compartments, and in the centre was a figure of St. John. Begun in 1366, it was not finished till 1477, and Ghiberti, Orcagna, Verrochio, and other artists worked upon it. In the present day gold and silver were far too precious to be used except in ordinary currency; in Europe alone it was estimated that these metals were employed for this purpose to the extent of over two thousand billion sterling, — or in small objects of use or ornament.

THE DECAY OF BRICKS. — Recent observations of M. Parize tend to show that the weathering of brick walls into a friable state, which is usually attributed to the action of heat, moisture and frost, is in reality due to a microscopic creature, the action played by the weather being only secondary. M. Parize examined the red dust of crumbling bricks under the microscope, and found it to consist largely of minute living organisms, and a sample of brick-dust taken from the heart of a solid brick also showed the same animalculæ, but in smaller numbers. The magnifying power of the instrument was about 300 diameters, and every brick showed the same distinctive features, but, in general, the harder the brick the fewer were the organisms. — *Engineering*.

BERMUDA HOUSES.

THREE men are at work on this side of a little hill within sight of the hotel, digging out a house. Anybody who would travel all over these Bermuda Islands would no doubt find as many as a hundred men engaged in digging out houses. There is nothing remarkable in this digging houses out of the ground, although at first there seems to be. I have seen houses dug out in New Jersey — some very nice houses. There they did them in the shape of clay, moulded it into bricks, and put the houses together afterward. In Bermuda they are saved this trouble, for the clay, or coral sand, or whatever it is, is already made into rock, and the workmen have nothing to do but saw it out in big blocks and stand it aside to season. It seems natural enough to an American to see wood standing by to season, but Bermuda is the only country in the world where they season rocks before using them. These three men at work on the hillside are very deliberate in their movements. They could give a New York laborer points in killing time. In this respect they are like most of the Bermuda workmen; but they get so little pay I think they are justified in doing as little work as possible. A dollar a day is as much as they earn, but they do not live on bread and water. The roof of one of the largest buildings in town, the Mechanic's Hall, is just at the foot of the hill on which the hotel stands. Two men have been whitewashing this roof for the last two weeks. Any man of ordinary whitewashing ability ought to do it in a day. But over on the hill three men have been at work for a month. Their tools are a great chisel with a long wooden handle and two or three big hand-saws. They began work by smoothing off a small space on the top of the hill, and a part of one of its sides. Every hill on the islands is composed of this same kind of rock, covered with a thin coating of earth, in which grass, flowers, and small cedar trees grow. The part of this rock that is exposed to the air is of a rusty black color, and looks hard and old; but when it is cut into the surface exposed is of a rich cream color, just about like the yellow bricks sometimes used in New York. The smooth place on the side of the hill is about six feet high, and it looks like a slice out of an immense lump of light brown sugar. The men go to work with the chisel and cut out a slice of the hill as large as they can conveniently handle — generally about six feet long and perhaps four feet broad, and the same in thickness. When this block is detached and rolled over on its side the men go at it with their saws and cut it into stones of the required size. These are nearly always cut to a standard size for building purposes, about two feet long by ten inches square. The blocks are as sharp-cut as so many bricks, and as regular in size as in shape, and as fast as they are cut out they are piled in heaps, like cord-wood, to dry. These heaps are generally put on the side of the road, and all over the islands may be seen cords of stone ready to be put together into houses.

They call this material stone, and I am not prepared to give it any other name, but it does not seem like what we are accustomed to call rock. If you were to take the coarsest sea-side sand you could find, and press a bushel or so of it into a square cake, it would be very much like this stone. In consistency, in color, and to the touch it is like the crumbly, yellow kind of molasses candy confectioners sell, — only, of course, it is not sticky. When newly cut out the blocks look rich and clean enough to eat. The stone is then so soft that you can take an ordinary penknife and whittle it easier than a piece of soft pine. It is only a minute's work to drill a hole through the centre of one of the blocks. The solidity of the rock varies in different places. In some hills it is pretty hard when first taken out, and in others it is so soft that it cannot be worked at all, but crumbles into sand as soon as touched. The hard hills are regularly worked for quarries, and the soft hills afford browsing room for goats. When this stone is cut into thin slabs it has to be handled very carefully. They cut the blocks into slices about an inch thick for roofing purposes, and one of these pieces, if held by the two ends when fresh, would break by its own weight. The rock is exceedingly porous. Indeed, it is almost like a sponge, for it is capable of absorbing its own weight of water. A block of it weighing one hundred pounds, if dipped in the sea, comes out weighing two hundred. Fortunately they don't sell it by weight, or you may depend upon it the Bermudians would sell it damp.

A man who is going to build a house has as many of the blocks sawed out as will be necessary for the walls; and thin slabs for the roof, and lets them stand and season for a year or more. If he is in a hurry to build, (but he never is if he lives in Bermuda,) he buys stones that are already hardened. By the end of a year his blocks

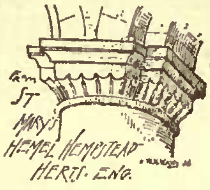
will be hard enough to use, but not hard like the stones we are accustomed to in America. After they have been exposed to the air for fifty years, you can cut notches in them with a penknife. It does not take the Bermudian long to choose a site for his house. In the towns of Hamilton and St. Georges, as in other towns, a man must take what vacant spot he can find, but out in the country when a man owning any considerable quantity of land wants to build a house he makes for the top of the highest hill. Hill-tops are the favorite places, and valleys are at a discount. This seems strange, for the valleys have the richest of soils, and are filled with tropical vegetation that would not flourish on the hills, where the sea-breezes blow. There is no doubt some good reason for it, but I do not know what it is. Perhaps the Bermudians are fond of a view of what they consider "the whole boundless continent;" perhaps the high lands are healthier. I think the latter is the more probable, though I have never heard of any sickness in the valleys. If the hill-top selected for the house is composed of hard rock, the blocks are cut out on the spot, and the excavation thus made does duty for a cellar. It is commonly said that a Bermudian cuts his house out of his cellar, but this happens only occasionally. No foundation needs to be built, for the basis is the rock itself of which the whole island is made. It is an easy matter, of course, to lay the blocks on top of one another with a little cement between; but the roof is not so easily made. The framework of the roof is made of cedar, and curiously enough, it is made and put together on the ground, the pieces mortised and dovetailed together, and, when all complete, is taken apart and put up where it belongs. It has rafters, like our roofs, with light longitudinal slats, about six inches apart, on which the stone slabs are laid. The roof is usually the most expensive part of the building, for cedar is dear. A tree of any size is worth a guinea just as it stands. They use as little firewood as possible, for it is costly. Such small pieces of cedar as are not fit for anything else, and logs too thin for better uses are sold for fuel; but not sold by the cord, nor even by the bundle, as we buy kindling in New York. It is sold by the pound, at the rate of twenty pounds for sixpence, which would bring it to $12 a ton. And any morning visitors may see little ebony shavers about the wood market, telling the salesman that "mam" sent them after twenty pounds of wood. The floors of the houses are made of pine, which is all imported; but all the other material is native. In making the roofs the slabs of stone are laid on like slates, and the roof-maker has to be careful to step only over the rafters, or his foot will go through. The interior partitions are made of the same stone; and when the house is finished its owner has a structure that, if it should rain, would absorb about two hogsheads of water to the square yard; but he does not give the rain a chance. As soon as the walls and roof are up he covers them with a coating of thin cement that makes them absolutely water-proof. This cement is put on the walls within and without, and there is no lathing. The same stone that makes part of the exterior wall forms a part of the wall of the room. As soon as the cement is dry the whole thing is covered with a coat of whitewash — roof, walls, and all; but it is whitewash that will not rub off. They have a way of preparing the wash so that it is as firm as paint. Sometimes they do it by putting a little turpentine in it, and sometimes they put in a decoction of prickly-pear leaves; but whatever they use, the visitor may lean against the whitest wall with a broadcloth coat without fear of soiling it.

When all this is done the Bermudian has a house that will last a thousand years. Every year it stands it becomes harder and stronger. In such a climate as they have here the building will outlast even such an extended family as that of the Duke of Argyll, or the Rex family of England. If there should ever be a frost half of the houses in Bermuda would crumble, but a frost has never been known here. There still remains, however, a very important part of the building to construct. This is the water-tank. It is said by everybody who has written anything about Bermuda that there are no wells in the island, but I know this to be a mistake, for I have drank water out of several Bermuda wells. There are not, though, more than half a dozen wells in the whole islands, and the people depend entirely upon catching rain-water. For this purpose they build large tanks, generally in the shape of a little addition or "lean-to" at the back of the house, just as in America we build a wood-shed. An ordinary tank usually holds three or four hundred barrels of water, which is carried from the roof by a stone gutter. The tank is built of the same kind of stone, lined with cement, and has a little window in one side, through which the cook reaches with a pail and dips out the water as she needs it. The water contained in these tanks stands till it is used but never becomes foul, and no one would notice the difference between Bermuda rain-water and the best Croton. Every house has its tank, and there is a constant supply of hundreds of millions of gallons scattered over the island. In the town of Hamilton every householder is required by law to build a tank, and in other parts of the island they do it from necessity without legal compulsion. There is plenty of rain and no danger of a lack of water, but the Government has built a steam-condenser at St. Georges to supply the troops with fresh water in case there should be a continuous drought. But save in exceptional seasons there is generally a little shower nearly every morning, lasting, sometimes, only five or ten minutes, sometimes for half an hour, and always followed immediately by bright sunshine. For the last three weeks there has been hardly a drop of rain and everything is very dry. In these three weeks the thermometer has not varied ten degrees, ranging between 69° and 78°, till I have almost come to believe it is a sort of stationary thermometer without the power of going either up or down.

The native style of Bermuda house is square, the larger ones with four-sided roofs, the smaller with two sides. Most of the large houses are two stories high, but there are many one-story ones. There is no earthly excuse, in my opinion, for building a house more than one story high in such a place as Bermuda, where there is plenty of building material and land is cheap. There are not more than four or five three-story buildings on the islands, and it is only in later years that any effort has been made to get out of the old style of square houses, with nearly flat roofs. Probably the largest dwelling-house in Bermuda is the residence of J. H. Trimingham, where the Princess Louise is staying. This is two stories high, and looks somewhat like an American country house.

What does it cost? That's what a New Yorker generally wants to know. Outside of Mr. Trimingham's, I do not see how any private house on the islands can have cost more than $2,000. Labor is cheap, material is plenty, and land can be bought low. This is, of course, merely for the house — the walls and roof and floors — and does not include any ornamentation or furnishing that fancy may suggest. There are plenty of places in Bermuda that could not be duplicated for ten times the sum named, but the expense is in the contents, not in the building. A New Yorker could come down here and with $10,000 make himself a residence that could not be duplicated in the metropolis for a million. Servant girls get $5 and $6 a month, and everything is cheap but meat, which is dear. Any New Yorker who contemplates building in Bermuda, need not be kept away by the fear of taxation. Americans, of course, cannot buy land there at all without taking the oath of allegiance to the British Government, but they get a friend to buy property and then take a mortgage on it, which answers the same purpose. The Hamilton Hotel is one of the finest buildings in Hamilton, perhaps without any exception the best; and the taxes on building and grounds are "two and six" a year, or about sixty cents. On an ordinary dwelling-house and lot the tax is about twenty-five cents a year. This is because the imperial Government pays nearly everything and leaves very little for the Bermudians to settle for. The Government "runs" the schools, the Church, the roads — everything.— *Correspondence of the N. Y. Times.*

HARDENED COPPER AND THE ART OF DRESSING AND CARVING STONE AMONG THE ANCIENT PERUVIANS.[1]



AT the time of the conquest, Peru extended from the Second degree North to the Thirty-seventh degree South latitude, from Quito to Cusco. A road, whose present remains attest its importance, traversed it for nearly eighteen hundred miles, over mountains often covered with snow and furrowed by forests, which last were crossed by singular suspension bridges, which oscillated like hammocks. This long highway, paved with flagstone, rarely exceeded in width twenty to twenty-three feet, and was built from material dug out of the Cordilleras.

The arms of the natives were bows and arrows, a kind of short sword, battle-axes and lances. The arrows and lances were often tipped with metal. Their utensils were sometimes stone, but more frequently copper, combined with tin in certain proportions, to render them more lasting, but without acquiring by this mixture a durability comparable to brass or even approaching that of iron. By an analysis made under the direction of Humboldt, one ancient bronze instrument showed a combination of copper 94 parts, tin 6 parts; another specimen yielded copper 95.5, tin 4.5.

While remains in *worked* stone are rare in Peru, nevertheless the mines of Fiahuanaco, Ollantaytambo, and the locality called La Fortalezza, with some others, yielded stone thus worked, and with an admirable perfection of line and surface; but these constructions belong to a very ancient period, far anterior to the time of the Incas.

The quarries from whence all these stones seem to have been taken are found about forty-five miles in a straight line from the actual town of Fiahuanaco, on the isthmus which joins Copacabana with the main land.

M. Raimondi says that the ancient Peruvians split up the stone in the quarry by first heating it by the burning of straw, and then throwing cold water upon the heated mass. In building with this material they used inclined planes, up which the stone was drawn by cables made by the Indians. The tools of "hardened copper," as the author calls them, were similar in shape to our chisels, with a cutting edge at one end only.

To carve the stone and obtain a bas-relief, M. Raimondi contends that the workmen covered with ashes the lines of the design which they intended to have in relief, and then heated the whole surface. The parts of the stone which were submitted immediately to the action of fire became decomposed to a greater or less depth, while the designs protected by the ashes, which is a bad conductor of heat, remained intact. To finish his work the sculptor had only to pass lightly over the design with his copper chisel.

Of mortar they used several kinds: with a species of bitumen very abundant in certain parts of Peru they made a cement which hardened quickly and held firmly; a mixture of lime and bitumen was used in the construction of their irrigation canals. Clay was

[1] Translated by *Engineering News* from the *Moniteur Industriel.*

used to make unburnt bricks and cements, and in some localities use was made of a calcareous stone, to which was added a variable quantity of clay, making a kind of hydraulic lime. The largest unburnt bricks were from three to five feet long, and two and a half to three feet thick.

In ordinary constructions the walls of either burnt or unburnt brick rarely exceeded in thickness sixteen inches, but sometimes they were twenty-two to twenty-five feet thick, and in certain aqueducts as much as forty feet thick, to guard against the shock of earthquakes. When the Peruvians wished to make a wall of great resisting power, having only small material at their command, they obtained the required volume by raising two or three of these walls, sometimes more, one behind the other.

LIME KILNS.

PARKERSBURG, W. VA., May 3, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Can you refer me to any person who can give me information how to build a *lime kiln* capable of making 400 bushels per day. Or if you know of any book on *lime-burning* and *kiln-making*, you would oblige me very much by letting me know through your valuable paper. SUBSCRIBER.

[WE do not know of any modern American book on the subject. Perhaps some of our readers can give you the necessary information.—EDS. AMERICAN ARCHITECT.]

ROUGH-CAST IN NORTHERN LATITUDES.

May 5, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — Will you please answer the following questions through the columns of the *American Architect?* Will the climate of the Middle States admit of a successful treatment of rough-cast plaster-work for the exterior of a frame building? If so, what are the ingredients and their proportions, and what the method of their application? Can ordinary pine lath be applied for the reception of the plaster? Can color,—Indian red, yellow ochre, for example, —be mixed with the plaster without materially affecting strength, etc. Very truly yours, F.

[THERE is no difficulty in using rough-cast plaster on the exterior of frame buildings in the Middle or Northern States. The mortar should be mixed as for the first coat of plastering, but without gauging with plaster-of-Paris, and cement may with advantage be mixed with the lime in as large proportion as it will bear without setting too quickly. We should generally use one part cement to two of dry lime, and if the plaster is to be colored, would mix a small quantity of linseed oil with the mortar. The first coat is often put on pine laths, but stands very much better on wire lathing. The wire lathing should be of the heaviest quality, so that it will not move under the necessary manipulation, and thereby split the coat of mortar in two. After applying the mortar, and while it is yet soft, patterns may be impressed in it with wooden moulds, or pebbles, bits of colored glass, or other ornaments may be imbedded in it. The ancient way of applying "rough-cast," or "pebble dash," was, after the first coat had become somewhat hard, to mix the pebbles with a thin lime mortar, and throw the mixture on the wall. Whether this mode is ever imitated now we cannot say. The addition of color to the plastering mortar has little or no influence on its strength, but there are not many colors which will resist the caustic action of the lime. Venetian red is one of the best; yellow ochre is also excellent for such uses, and gives a good color. French blue can also be used. The two former colors retard slightly the drying of the mortar.—EDS. AMERICAN ARCHITECT.]

THE BEST BOOK ON PERSPECTIVE.

CHICAGO, May 5, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen,— Will you be so kind as to inform me through the *American Architect* which is the best book on perspective.

Respectfully yours, H. G.

[*Modern Perspective*, a Treatise upon the Principles and Practice of Plane and Cylindrical Perspective, by Professor William R. Ware. Published by James R. Osgood & Company, Boston, Mass. Price $5.00.—EDS. AMERICAN ARCHITECT.]

BOAT-HOUSES.

197 DE KALB AVE., BROOKLYN, N. Y.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — Can you put us in communication with some builder that makes a business of building boat-houses. Myself and friends are desirous of building a small boat or club house at a place called Centre Moriches, Long Island. We would like to find out how much it would cost to build a house 20' x 35', one story, with a 10-foot piazza on the four sides. Also the cost with a 12-foot piazza on the 35-foot side *only*. If you can do anything for us you will confer a great favor on a reader of your paper. Yours respectfully,

R. B. PRICE.

[WE do not believe that there are enough boat-houses built in the whole country to warrant any man in undertaking such work as a specialty. Any reputable builder can figure out the cost of the house, you wish to build in half an hour.— EDS. AMERICAN ARCHITECT.]

VIOLLET-LE-DUC once said that the locomotive was as great a piece of pure architecture in its way as a cathedral.

NOTES AND CLIPPINGS.

SINKING OF A LARGE BUILDING. — A curious instance of the difficulties which the peculiarities of tropical soils give rise to when dealing with the foundations of heavy buildings has recently occurred in Georgetown, the capital city of British Guiana. Designed by the government engineer until lately in charge of the Public Works Department of that colony, some erections intended for use as law courts had proceeded to a certain point, when the successor to the office above named discovered that the buildings were bodily sinking, and this — as far as we have been able to learn — was taking place without any settlements or cracks being visible in the walls of the building, and without any disturbance of the surface soil close to them. In fact, it was not easy to detect the immediate cause of the subsidence, but it was ultimately found that at a few yards distance the ground was bulging upward. The present head of the Public Works Department in his report in no way reflects upon the character of the design given by his predecessor to the footings, or on the dimensions of the foundations. There is nothing, indeed, in these to find fault with, and the difficulty has arisen apparently from the two-fold character of the soil in the immediate vicinity of the buildings; that on which the work is erected being of good, solid, unyielding sand, but being surrounded to all appearance by a bed of earth less capable of withstanding either vertical or lateral pressure. The consequence has been that this surrounding belt of earth has yielded upward to the force exerted upon it by the lateral thrust of the squeezed material immediately below the buildings. — *Scientific American.*

PROPOSED NEW LIGHT-HOUSE IN LOWER DELAWARE BAY. — The Fourteen-foot Bank in the Lower Delaware Bay, between the Brandywine and Cross-Ledge Shoals, has had for years stationed upon it a light-ship. Owing to the heavy flow, it has been found almost impossible to keep this light-ship in position, especially in the winter months, when most needed. In order to secure the permanent location of this beacon, as well as to guide vessels not only clear of the Fourteen-foot Bank, but also from the lower end of the Joe Flogger Shoals, the Light-house Board has decided to erect a light-house on this spot. There are peculiar engineering difficulties surrounding this project, since there is a depth of 21 feet of water over the Fourteen-foot Bank, and then a depth of some 23 feet of quicksand to be got through before a solid stratum of clay suitable for foundation can be reached, there being no rock bottom at this point. The plans of the engineers under consideration at the present moment comprise a caisson 50 feet in diameter at the base, 30 feet diameter at the top, and 43 feet in height. It is proposed to build the caisson of cast-iron plates made separately and bolted together on the inside by flanges, the outside surface being smooth and regular. There is now available an appropriation of $175,000 for the prosecution of this work. It is proposed to float the caisson into position by means of a "camel," and by pumping the water into this latter to gradually sink the caisson to its foundation level. The pump to be employed for this purpose is designed for a capacity of 500 gallons per minute. From present indications it would seem as if the contracts for the work would be given out before the close of the present year. — *The Iron Age.*

THE PALACE OF THE POPES AT AVIGNON. — A correspondent of the *Daily News*, writing from Avignon, says: —"Many of your readers will, I feel sure, be glad to hear that the French Committee for the Preservation of Historical Monuments has at length succeeded in making an arrangement by which the Palace of the Popes in this interesting old city will shortly cease to be used as barracks for the garrison. This act of vandalism dates from the first year of the reign of Louis XVIII., and since that time much irreparable damage has been done to the frescoes, while many of the rooms have been disfigured by whitewash. Party-walls have been knocked down in some places, and wooden partitions run up in others, and despite all that has been done the palace has not, as may readily be imagined, been at all comfortable as military quarters. Remonstrances against the barbarous use to which this historical building was being put have been made from time to time for the last fifty years, and just before the fall of the empire it seemed as if the scandal would shortly cease, for some new barracks were built for the garrison close to the station. But just as they were ready for occupation the war with Germany broke out, and after it was over the French pontoon corps, whose headquarters were formed at Strasburg, was sent to Avignon to do their exercises upon the Rhône, now that the Rhine was no longer available. So the ordinary garrison perforce remained in the Papal Palace, and some fresh arrangement had to be made. M. Viollet-le-Duc, the eminent architect who restored the ramparts of Avignon with so much ability, did his best to obtain the consent of the Minister of War to the erection of fresh barracks, but he died before anything was settled, and the Committee for the Preservation of Historical Monuments has experienced great difficulty in extracting a definite promise. This promise has, however, been given, but the Palace will not be evacuated until the new barracks are finished."

INGENIOUS BUT IMPROBABLE. — A Buffalo manufacturer of lime and cement, Mr. Cummings, says that he has examined the Egyptian obelisk in Central Park, New York, and finds that it is not natural stone, as has been generally believed, but rather a mass of concrete composed of pieces of granite from the size of a walnut down to that of wheat. These stones are mixed with some bituminous matter not unlike asphaltum, and the stones and asphaltum are mixed with hydraulic lime containing clay. The thinness of the lime shows, according to Mr. Cummings, that the men who made the obelisk knew how to make concrete. The hieroglyphics must have been formed by fastening letters on the inside of the box into which the concrete was placed, every letter being made to "draw." The obelisk can be carried up by this process at the rate of about a foot a day, and can be exactly reproduced now at an estimated cost of $15,000. There is no doubt that it will last for ages, which would not be the case if Roman cement instead of hydraulic lime had been used.

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

276,549. BRICK AND TILE MACHINE. — James C. Anderson, Highland Park, Ill.
276,563. SHUTTER AND FASTENING THEREFOR. — Jonas Cooper, Washington, D. C.
276,585. FIRE-ESCAPE. — George Hofmann, Jr., and Austin D. Hoffmann, Chicago, Ill.
276,587. STORE. — Jas. A. Houston, Boston, Mass.
276,610. FIRE-ESCAPE. — George W. Lindsey and Harry W. Raleigh, Baltimore, Md.
276,622. VISE. — Jacob A. Painter, Arthur, Ill.
276,623. LOCKING-LATCH. — Frederick Palmer, Hampton, Va.
276,626. DOOR-OPENER. — Martin L. Powell, New Castle, Ind.
276,654. EAVES-TROUGH HANGER. — Jonathan P. Abbott, Cleveland, O.
276,669. FIRE-ESCAPE. — William F. Clerk, Boston, Mass.
276,715. FIRE-ESCAPE LADDER. — James Riley, New York, N. Y.
276,730. FIRE-ESCAPE. — Albert P. Sturtevant, Norwich, Conn.
276,736. FIRE-ESCAPE. — Henry B. Walbridge, Brooklyn, N. Y.
276,761. INCIDENCE-WINDOW. — Friedrich Bredehorst, Bremen, Germany.
276,767. AUTOMATIC ELEVATOR-HATCHWAY GUARD. — Joseph Byers, Newtonville, and George Taylor, Everett, Mass.
276,784–785. ELEVATOR. — Levi Daso, Pioneer, O.
276,815. FIRE-ESCAPE. — Gustavus Heidel, St. Louis, Mo.
276,831. WINDMILL AND DERRICK. — Isaac W. Lamb, Parshallville, Mich.
276,849. SAFETY-APPARATUS FOR ELEVATOR-PLATFORMS. — Volney W. Mason, Providence, R. I.
276,856. MACHINE FOR MAKING ROOFING FABRIC. — Henry M. Miner, Pittsburgh, Pa.
276,858. DOOR-LOCK. — Alphonse Montant, New York, N. Y.
276,861. DRY-PRESSING BRICK-MACHINE. — Henry B. Morrison and George Willett, Motley, Minn.
276,886–887. WINDOW-SASH. — Alexander Rudolph, San Francisco, Cal.
276,913. SASH-WEIGHT. — Gary B. Smith, Denver, Col.
276,942. KNOB-ATTACHMENT. — Robert S. Watson, Bay City, Mich.
276,958. SPRING-HINGE. — Charles B. Clark, Detroit, Mich.
276,969. FIRE-ESCAPE. — Arthur C. Hitchcock, Decorah, Iowa.
276,973. FIRE-ESCAPE. — George Kelly, Chicago, Ill.

SUMMARY OF THE WEEK.

Baltimore.

POLICE STATION. — Messrs. F. E. & H. R. Davis, architects, are preparing drawings for a three-st'y building to be erected cor. Calhoun and Pratt Sts., to be designated the Southwestern Police Station. It will be of brick and stone, 43' x 93', and cost $30,000.

STORE AND HALL. — Mr. W. F. Weber, architect, is preparing drawings for Jas. Billingsley, Esq., for a two-st'y building to be erected cor. Gay and High Sts. It will be of brick, with stone and terra-cotta finish, 27' x 95', and cost $8,500.

DWELLINGS. — G. A. Blake, Esq., is about to erect two Amherst stone front houses, on Biddle St., between Charles and St. Paul Sts., each 18' x 65', and to cost $12,000, from designs by Messrs. J. A. & W. T. Wilson, architects.

BUILDING PERMITS. — Since our last report twenty permits have been granted, the more important of which are the following: —

A. L. Gorter, 9 three-st'y and mansard brick buildings, n s Preston St., between Maryland Ave. and Morton Alley.

E. S. Purkey, 12 three-st'y brick buildings, e s Gilmor St., n e cor. Gilmor and Mulberry Sts., and 4 three-st'y brick buildings, n s Mulberry St., e of Gilmor St.

Chas. M. Kraemer, two-st'y brick building, s s Portland St., between Greene and Emory Sts.

Dubriel & Co., four-st'y warehouse, n s Baltimore St., between Howard and Eutaw Sts.

Ann Morgan, three-st'y brick building and two-st'y brick stable in rear, e s Mount St., between Lanvale and Townsend Sts.

A. L. Townsend, two-st'y brick building, 40' x 90', w s Race St., between Wells and McComas Sts.

Boston.

THE MONTH'S WORK. — During the month of April, 21 brick and 119 wooden permits were granted at the office of Inspector of Buildings.

BUILDING PERMITS. — *Brick.* — *Chelsea St.*, cor. Foss St., Ward 5, for Patrick O'Riordan, family hotel, 32' 6" x 43' 6", four-st'y flat; family hotel, 26' x 42' 4", four-st'y flat; dwell. and store, 13' and 40' x 42' 4" and 49', four-st'y flat.

Newbury St., Nos. 138 *and* 140, Ward 11, for Alden Avery, 2 dwells., 24' x 53', three-st'y mansard; Alden Avery, builder.

Garrison St., near St. Botolph St., Ward 11, for Massachusetts Institute of Technology, mechanical, 131' 8" x 150' two-st'y flat; and boiler-house, 24' x 24', one-st'y flat.

Washington St., Nos. 81–89, *and Elm St.*, Nos. 18–24, Ward 7, for Howard Sargent, trustee, mercantile, 54' x 45' and 74', five-st'y flat.

Wood. — *Maverick St.*, rear, near Jeffries St., Ward 2, for Columbia Boat Club, boat-house, 30' x 60', two-st'y pitch; A. & J. McLaren, builders.

Western Ave., rear, nearly opposite Everett St., Ward 25, for P. O. Callahan, storage of wagons, 18' x 50', one-st'y pitch; Geo. Hudgate, builder.

Dorchester Ave., Ward 13, for Continental Sugar Refining Company, storage-building, 120' x 187' 6", and 96' x 146', one-st'y flat; John K. Peke, builder.

Virginia St., cor. Davenport Ave., Ward 20, for Lucien J. Fosdick, dwell., 30' x 37', two-st'y pitch.

East Fifth St., No. 687, Ward 14, for Lorenzo D. Cardell, carriage-house, 18' x 40', one-st'y flat.

West First St., cor. B St., Ward 13, for Boston Cooperage Co., cooper-shop, 100' x 400', two-st'y flat.

Corbett St., near Norfolk St., Ward 24, for Samuel B. Pierce, dwell., 21' 2" x 32' 7", two-st'y pitch; W. J. Jobling, builder.

Commercial Point Wharf, near Union St., Ward 24, for Boston Gas Light Co., storage of coal, 179' and 192' x 248' 6" and 278', and 14' x 276', two-st'y flat; Geo. Barker, builder.

West Fourth St., Nos. 45 *and* 47, Ward 13, for James Devine, 2 dwells. and stores, 19' x 32' each, three-st'y flat; James Devine, builder.

Forest Ave., Ward 21, for Lucinda F. Tripp, 2 dwells., 24' x 37', two-st'y pitch; John G. Allbright, builder.

Centre St., near Lamartine St., Ward 23, 2 dwells., 24' x 36', three-st'y flat, for Wm. Magee; Jas. Cook, builder.

Melville Ave., near Wardeck St., Ward 24, for Julius Pratt, dwell., 24' and 29' x 38', and 12' 8" x 22' 6", two-st'y hip; Chas. Haywood, builder.

Tremont St., No. 86, Ward 3, for P. J. Navy, 2 dwells., 19' 6" x 30', three-st'y flat; John Hayes, builder.

Regent St., near Dale St., Ward 21, for John P. Santry, dwell., 31' x 40', three-st'y flat; dwell., 32' x 40', three-st'y flat; Andrew P. Anderson, builder.

Washington St., rear, near Keyes St., Ward 23, for Boston Thread and Twine Co., storehouse, 15' x 69', one-st'y flat; Chas. H. Lewis, builder.

Bearse Ave., near Butler St., Ward 24, for Henry G. Healey, dwell., 22' x 28', two-st'y pitch; Joseph A. Healey, builder.

West Seventh St., Nos. 105 *and* 157, Ward 15, for Sarah O. Malley, dwell. and store, 28' x 30', three-st'y flat; Isaac H. Y. Dunn, builder.

Dorchester Ave., near Greenwich St., Ward 24, for Patrick & Michael Finnegan, dwell., 27' x 32', three-st'y flat; Michael Ryan, builder.

Mayfair St., near Bainbridge St., Ward 21, for Thomas J. Thomas, dwell., 21' 2" x 50' 7", two-st'y pitch; Charles H. Blodgett, builder.

Eagle St., No. 260, Ward 1, for James M. Simpson, dwell., 28' x 45', two-st'y pitch; James Emroe, builder.

Dorchester Ave., cor. Alger St., Ward 15, for Alfred L. Armstrong, dwell. and store, 32' x 40', two-st'y flat.

Rutherford Ave., No. 82, for John Donovan, dwell., 13' and 20' x 28' and 33', three-st'y flat; Edward J. Tulley, builder.

Waterloo St., rear, near Harvard St., Ward 24, for Geo. L. Studley, stable, 15' x 18', one-st'y pitch; Geo. L. Studley, builder.

Brooklyn.

BUILDING PERMITS. — *Van Buren St.*, s s, 24' w Sumner Ave., 6 two-st'y brownstone front dwells.; cost, each, $5,000; owner and builder, Patrick Concannon, 187 Wythe Ave.; architect, I. D. Reynolds.

Van Buren St., s w cor. Sumner Ave., three-st'y brownstone front store and flats, tin roof; cost, $10,000; owner, etc., same as last.

Halsey St., e s, 240' e Lewis Ave., 3 two-st'y brick dwells., gravel roofs; cost, each, $5,500; owner, L. M. Nichols, 496 Macon St.

Meserole Ave., s e cor. Newel St., four-st'y frame tenement, gravel roof; cost, $5,000; owner, James Burke, on premises; architect, F. Weber; builder, J. Fallon.

Twenty-seventh St., n s, 260' e Third Ave., three-st'y brick tenement, tin roof; cost, $4,000; owner, Patrick Gray, 94 Third Ave.; architect, C. B. Sheldon.

North Elliott Pl., e s, 125' n Myrtle Ave., three-st'y brick store and tenement, tin roof; cost, $3,500; owner, Smith W. Tryon, North Oxford St.; architect, H. Van Nostez; builders, C. A. & S. B. Bartow and R. Tryon.

Franklin Ave., w s, 100' n Greene Ave., two-st'y brownstone and brick front dwell., tin roof; cost, $5,500; owner and builder, Myron C. Rush, 329 Franklin Ave.; architect, G. P. Chappell; mason, C. King.

McDonough St., Nos. 384 *and* 386, s s, 170' e Stuyvesant Ave., four-st'y brownstone and brick asylum-building; cost, $20,000; owner, Hebrew Orphan Society, 380 and 382 McDonough St.; architect, T. Engelhardt; builders, U. Maurer and C. L. Johnson.

ALTERATION. — *State St.*, No. 75, raised half-st'y, gravel roof, and four-st'y brick extension, new foundations built; cost, $9,000; owner, Mrs. C. Gilmore; builders, H. L. & W. A. Southard.

East Seventy-fifth St., Nos. 20 *and* 22, one-st'y brick extension; cost, $5,000; owner, Wm. S. Maddock, 313 East One Hundred and Twenty-third St.; superintendents, Maclay & Davies.

Seventieth St., s s, 20' w Madison Ave., four-st'y brick extension; cost, $10,000; owner, Stephen Barker, exr., 24 East Seventieth St.; architect, G. A. Schellenger.

Front St., n w cor. Wall St., internal alterations; cost, $5,000; owner, Ellen S. Auchmuty and others, University Pl., cor. Twelfth St.; architect, H. S. Hardenburgh; builder, J. L. Hamilton.

Chicago.

APARTMENT-HOUSES. — C. P. Thomas, architect, has plans completed for a four-st'y apartment-house, 31' x 82', for Theodore G. Springer, to be built cor. of Division St. and Lasalle Ave., to cost $18,000.

John Otter, architect, has the following apartment-houses: —

An apartment-building on Whitney St., for J. F. Wash, to cost $16,000.

An apartment-building on Sedgwick St., for C. A. Helander, to cost $9,000.

An apartment-house at No. 15 Oak St., for F. Danielson, to cost $7,500.

An apartment-house on West Ohio St., for A. Mangson; cost, $7,000.

A pressed-brick tenement building, four stories and basement, on n e cor. of Sedgwick and Oak Sts., for H. Rumsfeld; cost, $20,000.

HOUSES. — John Otter, architect, has plans for Mr. O. Vider's dwelling, to be built cor. Garfield Ave. and Sedgwick St., to cost $9,000.

Mr. L. G. Hallberg, architect, is building an octagon addition to Prof. Swing's house, at No. 401 Superior St.

FLATS. — John Otter has on hand 3 four-st'y flats for Blomgren Bros. & C. P. Holmberg, pressed-brick and stone finish; to cost $40,000.

The same architect has plans for three-st'y and basement flats on Lasalle Ave., of Columbia and Berlin stone, for D. Donegan, to cost $30,000.

STORES. — John Otter has 2 three-st'y stores and dwells. on s e cor. of Ontario and Franklin Sts., for J. A. Lind, to cost $20,000.

C. P. Thomas, architect, has plans for stores on North Clark St., for Mr. F. F. Spencer, of pressed-brick and stone finish; cost, $20,000.

Five stores and flats at the s w cor. of State and Thirty-third Sts., for Herbert Cossard, of stone and pressed-brick; cost, $30,000.

BUILDING PERMITS. — J. Busam, two-st'y brick dwell. and barn, 20' x 50', No. 513 Sedgwick St.; cost, $4,800.

R. Hitt, three-st'y brick store and flats, 25' x 80', 254 Ogden Ave.; cost, $12,000.

John Rick, two-st'y brick dwell., 22' x 60', 14 Evans St.; cost, $3,900.

The Johnston Estate, two-st'y brick store, 24' x 60', 53 North State St.; cost, $2,500.

Carl Frenz, two-st'y basement brick flats, 22' x 56', 738 Girard St.; cost, $2,500.

Blomgren Bros. & Holenberg, 4 three-st'y brick flats, 69' x 100', 456–462 Hurlbert St.; cost, $35,000.

Edward Burk, two-st'y brick store and dwell., 22' x 40', 500 Twenty-sixth St.; cost, $3,000.

S. Prybyl, 2 two-st'y brick dwells., 48' x 55', Western St., cor. Armatage St.; cost, $4,500.

E. Schlick, four-st'y basement brick store and flats, 25' x 94', 437 North Clark St.; cost, $12,000.

John Roula, two-st'y brick dwell., 20' x 32', 482 Union St.; cost, $2,500.

T. C. McKay, two-st'y basement attic brick dwell., 22' x 36', 526 Ashland Ave.; cost, $3,000.

Mary E. Sands, two-st'y brick dwell., 50' x 64', 292 Hermitage Ave.; cost, $9,000.

Mathewe & Cornwall, 2 three-st'y brick dwells., 50' x 67', 648–650 Monroe St.; cost, $15,000.

John Rode, two-st'y basement and attic brick dwell., 20' x 67', 286 Hastings St.; cost, $5,200.

E. B. Wheelock, three-st'y brick flats, 25' x 76', 514 Jackson St.; cost, $7,000.

Cincinnati.

BUILDING PERMITS. — D. H. Baldwin & Co., four-st'y brick store, Fifth St. bet. Wood and Stone Sts.; cost, $7,000.

C. H. Weiss, two-st'y brick building, 660 Sycamore St.; cost, $3,500.

Wm. Onitges, four-st'y brick building, 512 Race St.; cost, $7,000.

Peter Scherer, three-st'y brick building, s w cor. Liberty St. and Central Ave.; cost, $10,000.

Mrs. F. Darusmont, four-st'y brick building, 917 Vine St.; cost, $10,000.

A. J. Mullane, two-st'y brick building, cor. Central Ave. and Third St.; cost, $4,000.

Eight permits for repairs.

Total permits to date, 319.

Total cost to date, $1,163,000.

Milwaukee, Wis.

BUILDING PERMITS. — The following building permits have been granted by the Board of Public Works: —

H. Goese & Bro., brick veneered dwell., on Van Buren, between Wisconsin and Michigan Sts., to cost $2,800.

Fred Kropf, brick dwell., on Third St., in the Second Ward, for Mr. Blown, to cost $2,800.

Ferye & Kuppen, double brick house on Grand Ave., near Eighth St., in the Fourth Ward, for E. W. Meachan, to cost $12,000.

New York.

APARTMENT-HOUSE. — At Nos. 30 and 32 West Thirty-fifth St., a bachelors' aprtment-house, 40' x 100', eight-st'y, brick and brownstone, is to be built from designs of Mr. Jas. Brown Lord, at a probable cost of about $200,000.

HOUSES. — Messrs. Hubert Pirrsson & Co. have drawn plans for Mr. Morrill for six houses, to be built at Mott Ave., cor. One Hundred and Fiftieth St. They will be of brick, two stories and French roof, and will cost about $7,000 each.

For the Hon. Chas. H. Truax, a brick and terra-cotta house is to be built, from designs of Mr. Jas. S. Farnsworth, to cost $ 5,000. It is to be built on One Hundred and Twenty-fourth St., facing Mt. Morris Park.

MARKET-HOUSE. — Plans for Washington Market are being perfected by Mr. Douglas Smyth.

TELEGRAPH-BUILDING. — The competition for the Western Union Telegraph Company's building, Fifth Ave., cor. Twenty-third St., is, we hear, to be limited to three architects, who we understand are Messrs. H. J. Hardenbergh, E. E. Raht, and Bruce, Price & Freeman.

TENEMENT-HOUSE. — An improved tenement-house,

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THE proposed revision of the Building Law of New York has, we regret to say, failed to pass in the Legislature, and the reforms which would have been brought about by means of it must wait another year if, indeed, they will ever be accomplished. The present bill was substantially the same as that drawn up by Mr. Esterbrook some time ago, and possessed all the merits which would naturally be looked for in a scheme prepared by an intelligent and experienced man for correcting the weak points of a law which he had for years administered. It will be long, we imagine, before so favorable an opportunity will occur again, and those who wish well to the cause of good building should endeavor to keep in mind all the good points of Mr. Esterbrook's proposed regulations, as a guide for future legislation.

THE Electric Lines Company of New York, which has secured the privilege of constructing underground conductors, to be rented to telegraph or telephone companies, proposes to begin work immediately, and will lay its cables very rapidly through the principal streets of the city. The conduit to be used, instead of an iron pipe, is said to be a wooden box, nineteen inches wide and seven inches high, divided into three compartments, each compartment containing a cable of sixty-eight wires. In order to prevent induction the wires are kept apart by templets of gutta-percha, and after the templets are full they are revolved, so as to bring the wires into spiral lines. When this is done, the cable is placed in a mould and melted paraffine poured over it, which hardens into a sort of candle with sixty-eight wire wicks. This is a comparatively inexpensive process, and the company expects to reduce the cost of its lines below that of the overhead wires. The boxes are, it is said, to be laid two feet below the surface of the streets; but it is difficult to see how objects so fragile can be safely maintained in that position.

A CASE involving the right of telephone companies to the use of other persons' buildings as supports for their wires was decided in Hartford not long ago. It seems that the local telephone company, in running its lines, carried them over the roof of a block of stores on one of the principal streets. The owner was informed that it would only be necessary to use the building in this way temporarily, and that in about four days the wires would be removed to poles in the streets, and not wishing to incommode the company, he consented to this arrangement, saying that he would allow a week, instead of the four days asked for. At the end of the week, the representatives of the company came to him and asked for an extension of the time, which was granted, as were successive requests of the same kind, until the wires had been in place a month. By this time the owner, who had seen the period for which his courtesy was invoked increased to seven times its original limit, had lost patience, and he declined to extend it further. This apparently made no difference to the company, which simply left its wires where they were, and the owner then requested their removal. No reply was made to the request, and after some time a formal notice was served upon the company, that the wires must be taken from the building within a reasonable time, or they would be summarily removed by the owner himself. Even this brought no response, and after waiting several days the owner proceeded to the roof of his building armed with an axe, and knocked the company's property into the street. The company then brought an action against the owner for malicious mischief, and was promptly defeated, the jury bringing in a verdict for the defendant, with costs, in twenty minutes.

SEVERAL cases of undoubted typhus fever have occurred recently, both in Boston and New York, where the disease seems to have been traced directly to its source in the vapors generated by decomposing filth. Six cases of the fever occurred in one building, a crowded tenement-house in West Seventeenth Street, and it is remarkable that none of the patients were over eighteen years old, most of them being under five. This may, perhaps, show that the infection originated in the building, since children too young to go about would be less exposed to contagion from without, as well as more sensitive to the unfavorable influences immediately around them, and the investigation of the structure which was made by the attending physicians showed that the air of the cellar was in a most poisonous condition, the floor being covered with heaps of filth standing in pools of water. A thorough cleansing and disinfection of the cellar was immediately followed by a change in the condition of the patients in the rooms above, and while two, attacked early, died before the improvements were made, all who lived until they were completed began to show signs of recovery.

THE people of Boston have been entertained with another artistic competition, the subject this time being the great Unitarian minister, Theodore Parker, whom it is intended to commemorate by a bronze statue. We do not know the details of the competition, but imagine that it must have been somewhat similar to that for the Revere statue. However that may be, ten models have been submitted, by artists of about the same class as those who struggled for the little prizes on the other occasion. According to the Boston *Herald*, "there is considerable variety in the models," which is satisfactory, although there may be some question whether this might not have been better gained in some other way than by representing the divine in some cases as a terminal figure and in others as a fully clad human being, or by furnishing him with features ranging from those of Horace Greeley to the wrinkled countenance of a melancholy old man. As usual, now that the committee has secured the designs of those who were willing to make them on speculation, it turns from them with something like contempt, "to continue its correspondence with certain sculptors who have not as yet submitted models;" and we will again venture the prediction that if the statue is executed at all, it will be by one of those "certain sculptors" who has self-respect enough to refuse to "submit models" or do any other professional work without the assurance that he is to be paid for it.

IN the matter of the Revere statue, the committee which disposes of the questions of fine art is in a pitiable plight. After calling airily upon the little men, and respectfully upon the great ones, to lend their aid in furnishing a cheap design for an equestrian statue, it has suddenly been discovered that the idea of representing Paul Revere on horseback, if not reprehensible, is at least the product of an "unthinking sentiment," and that since Revere was "neither a professional soldier nor a courier," "historical exactness" requires that his statue should not exhibit him as mounted, or even, like one of the models submitted, as leaping about on the ground around a horse, but that "without any sacrifice of the poetic element to which the sculptor's art is so intimately wedded," he should be shown simply "in the character of a patriotic tradesman." Fortunately, the error of the committee, though grave, was not irreparable, and we are told that "it is gratifying to learn that

the idea of making the statue an equestrian one has been practically abandoned." What will be the result of this singular change in the scheme it is impossible to say. In one respect the new theory ought to lighten materially the Committee's labors, for statues of patriotic tradesmen, only requiring the features to be trimmed to suit customers, are kept in stock by most foundries, but, so far as we have observed, the "poetic element" is not so "intimately wedded" to these productions as might be desirable, and the task of extracting any sentiment or interest from a programme so utterly bald would appal Michael Angelo himself.

THE Hygienic Exhibition at Berlin, after a year's postponement, has just been opened to the public. The catastrophe which destroyed the buildings of last year has been guarded against this season by making all the structures on the ground of iron, and, according to the *Builder*, a plan was adopted which would seem worthy of imitation in other cases. In brief, the building consists of a cluster of cells, all alike, each being sixty-two feet square. Twenty-five of these are ranged side by side in five rows of five cells each, while extra cells of the same size, added at the ends of the main group, serve as promenades and refreshment rooms. We suppose from the description that each cell has its own roof, and constitutes a separate structure, supported on light columns, the merit of the system consisting in the ease and economy with which a series of light and simple buildings of this kind can be so grouped as to form an exhibition hall of any size, and, after their service is over, transported to some other place, and set up in a new form. The exhibits seem to be about the same as those intended to be shown last year, among them being a cremation furnace, a miniature theatre, a school of cooking, and a model dwelling-house.

LE GENIE CIVIL gives an interesting account of the construction of the new observatory on the summit of the Pic du Midi, a high, nearly isolated mountain, connected with the Pyrenees range, at an elevation of about ninety-five hundred feet above the sea. The position of the mountain, although exposing it to very violent tempests, is peculiarly favorable for meteorological studies, and the General de Nansouty, a devoted man of science, built at his own expense the structures which have now been offered to the government, and accepted in behalf of the public. As the wind-pressure on the summit, by actual measurement, sometimes reaches fifty pounds to the square foot, it was necessary that the buildings should be solid, and the variations of temperature extending from an observed maximum of one hundred and fifty-nine degrees above zero to sixty-three degrees below, it was desirable that they should also be made of a non-conducting character, while, as all materials except stone had to be brought by a painful journey from the pass below, it was important to make the best possible use of those on the ground. The crest of the mountain is so steep that its summit did not present any space large enough even for the small observatory building, and it was necessary to blast the peak with dynamite until a little valley had been excavated to contain the structure. In order to protect the habitable part of the observatory from the terrible cold, its walls were built double, the inner wall, of stone, eighteen inches thick, being surrounded by an envelope, consisting of a stone wall, two stories high, four feet thick in the first story, and three feet in the second. A space four feet wide was left between the inner and outer walls all around, covered with a stone vault. This space had windows on the south side, and served as a promenade, and corresponding windows in the inner wall admitted the light to the interior. On the north side, where the snow in winter often drifted higher than the top of the roof, small loop-holes only were left in the walls. The inner portion of the building was also covered with a stone vault, the extrados of which was brought to the profile of an ordinary roof, and covered on one side with slate, and on the other side with vitrified tiles. A season's experience, however, showed that the tiles were incapable of resisting the extreme variations of temperature, and that it would soon be necessary to replace them with slate. No timber was used in the roof, the slate and tiles being simply bedded in cement. The rain-water from the roof was collected in two cisterns, built of stone and vaulted. As the season during which building operations on the summit were practicable lasted only about six weeks, the construction, begun in 1874, was not completed until the summer of 1881.

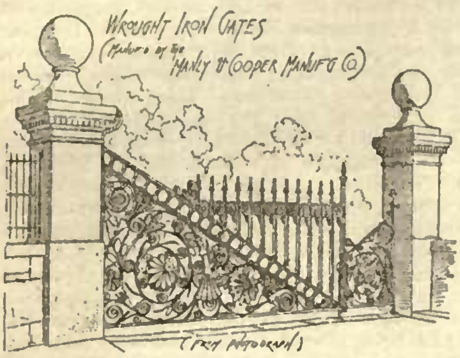
A GREAT scientific prize is to be awarded in the year 1887, under the name of the Volta Prize, to the person who shall before June 30 in that year make the most important discovery in electricity, as applied to the production of heat, light, chemical action or mechanical power, or as an agent for the transmission of messages or the cure of diseases. Those who think themselves deserving of this prize must present their claims before the French Academy of Sciences, but no limitation of nationality will be regarded in the award. The final judgment, in order to give time for full discussion of the merits of the various applicants, will not be pronounced until December of the same year. The prize is to be in money, and amounts to fifty thousand francs, so that it will be well worth competing for.

AMONG the many prizes open to students and practitioners of architecture in France is one which, according to the terms of the deed by which it was founded, is to be given for the encouragement of young architects who may have given proof of filial or fraternal piety. The prize is of the very substantial value of fifteen hundred francs, and has this year been awarded to M. Dollé. What may have been the particular act of devotion which won for him this recompense we do not know, but we take pleasure, as well in recording his merit and its reward, as in calling attention to the appreciation which personal as well as professional excellence meets with in France.

A SHIP-of-war has recently been built in Denmark which presents some novel features. The general form of the vessel resembles that of the well-known "Monitor," consisting of a hull nearly submerged, sustaining a turret protected by heavy armor. In order to give the hull as much displacement, and consequent sustaining power, as possible, and to diminish at the same time the weight of iron necessary to protect it, the bulwarks are not merely made low, but are actually submerged, the section deck forming an arch, of which only the crown appears above water. This deck is covered with iron and steel plates varying from one and two-thirds to three inches in thickness. The angle made by the deck-plates with the horizon is so small that projectiles aimed at them are expected to glance off, the turret being the only portion exposed to a direct blow, and their thickness is therefore correspondingly reduced. As a ship with an arched deck, most of which is under water, would present a rather awkward field for the manœuvres of the crew, a sort of false deck of wood is built above the iron, and boarded over, so as to form a surface nearly level. In action, these false works would soon be shot away, but to preserve them as long as possible they are made in separate sections, well secured to the iron, and the space between them and the real deck is filled with cork, which helps to arrest the shot aimed at the deck.

IN order to test the efficiency of the system, a temporary frame was constructed recently on an island near Copenhagen, and covered with plates corresponding in position and thickness with those of the new ship. The frame was then attacked with shot from two cannon, one of which was a Krupp breech-loader of six inches bore, while the other was a nine-inch Armstrong muzzle-loader. From the Krupp gun were fired first hollow, conical projectiles, of tempered steel, and afterwards shot of a new pattern, introduced by Herr Krupp expressly for penetrating armored decks, and consisting of a straight, cylindrical mass, having the front slightly hollowed, so as to present a sharp circular edge. The Armstrong gun was furnished with cast-iron projectiles of the Palliser pattern, and also with ordinary shells, with percussion fuse. With a range of five hundred yards all the projectiles made some impression on the plates, but the most decided effect was produced, very naturally, by the nine-inch Palliser shot, weighing two hundred and fifty pounds each, which broke their way, merely by the shock of their tremendous impact, through some of the plates, although they glanced off from the others. The edged projectile of Krupp, although weighing less than half as much as the other, proved nearly as effective, catching in the plates and ploughing its way deep into the iron. The bulwarks of cork, which were tested at the same time, appear to have done little or nothing to resist the shot, but in return, the cannon balls, and even the shells, passed through or burst in the soft substance without dispersing it, or even setting it on fire.

MODERN PERSPECTIVE.[1]



THIS work essentially consists of a series of illustrated "Papers on Perspective," commenced in No. 106 of the *American Architect*, Vol. III, continued in Vols. III and IV, and completed, after an interval of several years, in Vols. XII and XIII. These papers have been carefully revised, considerable additions made to them, especially a Summary and a chapter entitled "Geometrical Problems," containing a concise statement of the notation and methods employed, with brief solutions of the more difficult problems which would occur to draughtsmen, arranged for easy reference.

The book is published in two volumes, one containing the text, the other comprising the twenty-seven illustrative plates contained in a neat portfolio.

The science or art of Perspective is usually treated in one of two general ways.

1. As an applied form of Descriptive Geometry, when the practical side of the subject is subordinated to its scientific treatment, and the author pays most attention to "beautiful methods and applications;" *i. e.*, as a branch of mathematics, without much regard to the real value of the methods developed, or the ease with which they may be applied by the average draughtsman, usually with very little time to spend on the solution of intricate problems when preparing a competition perspective, or a sketch for publication. The objects selected for examples of the application of the methods are, too commonly, not those which most frequently occur in practice, so that the student obtains very little knowledge of the apparent forms of objects in perspective. Unfortunately, this kind of perspective is that generally taught at technical schools, where the study is usually considered merely as a branch of Descriptive Geometry, and the subject is assigned to an instructor of inferior rank, already fully occupied with other work, and who has had little practical experience in actually working out the perspectives of architectural structures. Consequently, when the student has completed the study, and is afterwards called on to draw a perspective of a given building, he finds many questions arising as to the best point-of-view, direction of light rays, proper scale, and, above all, what methods should be employed to obtain the required drawing in the quickest and simplest way. These difficulties were not noticed in his course of study. He either makes several attempts, wasting both time and patience, gradually learning from experience, or he goes to an expert perspective draughtsman and obtains "points" and instructions. In either case the student is pretty certain to come to the conclusion that his school training in the study is of very little practical benefit to him, and it is often discarded as useless, and forgotten.

2. As a purely practical study, paying no attention to its relation to Descriptive Geometry. This system is that commonly used by perspective draughtsmen when employed to give private lessons to other draughtsmen, who merely desire to acquire the simplest methods for doing the work, having but little time to spend in its study. They are taught special methods, which have been found suitable for the ordinary forms of buildings, usually without any explanation of the laws on which these methods are based, or of the relation of one method to another. This mode of teaching the subject makes the student merely an animated machine for obtaining certain results, limited to the methods taught him, and very apt to make serious errors in attempting to apply them to problems of different character, with which he is unfamiliar.

It therefore becomes evident that the best method of teaching Perspective would be to pursue a middle course, lying between the two extremes already pointed out, paying attention to the principles of Descriptive Geometry underlying all perspective methods, so that their relations may be clearly understood by the student, who can then employ any special method best suited to the case in hand, passing from one to another without difficulty: at the same time, the actual methods used must be those in practical use among draughtsmen, unless simpler ones can be devised, and such as will most quickly and easily accomplish the desired purpose. Such a course of instruction prepares the student for even devising original methods, whenever required for particular cases, if he possesses the requisite ability and inventive faculty.

Every draughtsman who has ever dabbled in Perspective, especially when it was used for purely artistic purposes, as for the correction of free-hand sketches of landscapes, buildings, etc., has observed that in certain cases, especially when the view embraced a large visual angle, many discrepancies and distortions of form occurred, particularly near the outer limits of the picture. If carefully drawn by perspective methods some objects appear so much distorted as to become too offensive to be tolerated; consequently, a general impression appears to be prevalent among artists, that a knowledge of perspective may be valuable, but that it is only applicable to buildings, and is of very little assistance to artists. It is therefore usually taught in most Art Schools in a sort of perfunctory and general way, with little real accuracy, and few such teachers ever take the trouble to explain the real cause of these distortions to their more observant pupils, and to show them how to make the proper corrections in the best and simplest way. This difficult portion of the subject requires careful treatment in any exhaustive work on Perspective.

Professor Ware has exactly appreciated these requisites for a mode of treatment best adapted to the practical needs of the draughtsman, without neglecting the scientific basis of the subject. Having the advantages of great experience and an extensive study of earlier works on the subject, the author has produced a work better suited to the wants of both the technical student and the draughtsman than any other previously existing, one which may be termed a Cyclopedia of Perspective, as it contains all he will ever need to know of the science. Although the applications are principally made to architectural subjects, the best methods of drawing the perspectives of circles are fully explained, so that the work will be found as valuable to the Civil or Mechanical Engineer as to the Architect.

Much original material has been added to our knowledge of the science by the author, especially in the use of perspective plans, the study of distortions and corrections, the perspectives of divergent lines and shadows, particularly with the source of light behind the observer, and also in Cylindrical Perspective, besides the fact that much other material is now presented in a convenient form, and made accessible to the student for the first time.

The work commences with a general consideration of the appearance of objects in perspective, when viewed from different points and under various conditions, with an explanation of the more common technical terms, and a statement of elementary principles.

In Chapter II, the picture is itself considered, with special insistence on the fact that the vanishing-point of any system of parallel lines will always be the point in the perspective plane pierced by a parallel line through the eye, and will also be found in the perspective trace of any plane containing either of the given lines. This principle is not often clearly stated in text-books on Perspective, but appears to be left to be discovered by the student. A special and original notation is introduced, much more simple and convenient than that employed in works on Descriptive Geometry, and which is used throughout the book.

Chapter III is devoted to the consideration of the perspective plan, its uses and practical applications being fully and clearly stated. The special advantage of its use is that several plans, taken at different horizontal levels, can be drawn beneath each other, and points are then projected up to the perspective or picture, thus avoiding all danger of the errors arising from using incorrect points, which are very apt to occur in the common method, in which the orthographic plan is employed, with lines radiating from the station-point and intersecting the ground-line of the perspective plane. The method of perspective plans is especially valuable and convenient in obtaining the perspectives of tall buildings, particularly when each story is of a different design, as a separate plan can easily be made for each story.

The methods of dividing perspective lines by the use of triangles and diagonals are then introduced, and afterwards more fully developed in Chapter IV, where the general applicability of the methods is exhibited, with satisfactory evidence that a large amount of work and time may be saved by their use, especially in obtaining the perspectives of large and elaborate structures. A demonstration of Gwilt's method for dividing perspective lines is given, and the method is much improved, by showing that the line drawn through one end of the given line, parallel to the second line, need not be of the same length as the first (as stated by Gwilt), so that dimensions could at once be laid off on it by scale, and then transferred directly to the perspective line to be divided, provided that both ends of this line are previously located. A knowledge of the applications of this method of dividing perspective lines, and of the uses of perspective plans, would alone be worth more to any perspective draughtsman than the entire cost of the book.

So far, the principal lines and points of the picture have been merely located by the eye, but in Chapter V, graphical methods are given for finding their exact locations and directions, the dimensions and forms of the objects as well as the point-of-view being assumed to be fully known. These methods are found to be of exceptionally easy application in case the principal lines of the object make angles of forty-five degrees with the perspective plane.

Chapter VII treats of Parallel Perspective, the uses of distance-points, and the proper mode for commencing a perspective of this kind, with a description of the uses to which it is properly applicable.

Chapter VIII is devoted to the Three-point Perspective, in which all the principal lines of the object are inclined to the perspective plane. Cases of this kind sometimes occur, as in the furniture of interiors, etc. Photographs of buildings are really in three-point perspective, when taken with a camera whose optical axis is inclined upwards or downwards, the sensitive plate being also perpendicular to this axis, and not vertical. This causes tall towers to appear to lean inward toward each other, since the vertical lines of the façade appear to radiate in this case from a vanishing-point. Such photographs really represent the appearance of the building to the eye, but

[1] *Modern Perspective*, a Treatise upon the Principles and Practice of Plane and Cylindrical Perspective, by Professor William R. Ware. Boston, Mass.: James R. Osgood & Co., 1883.

are apparently incorrect, since they are viewed under different conditions.

The perspectives of the shadows of sunlight are considered in Chapter IX, and the very valuable practical suggestion is made that, if the sun be assumed to be located in the perspective plane at an infinite distance, its rays are parallel to the plane of the picture; their perspectives will therefore be parallel to each other, and will be easily found; also that this position of the sun will be almost invariably certain to produce a picture in which the light and shade is properly arranged for obtaining a picturesque effect. This remark solves a difficulty which perplexes even experienced draughtsmen not a little. Simple methods are also given for determining whether the plane surfaces of objects represented in the picture are in light or shadow.

Chapter X treats of the perspectives of reflections, which is reduced to the general problem of finding the reflection of a line and the vanishing-point of this reflection, as well as that of the projecting lines drawn from the given line normal to the reflecting surface. If the given lines be normal or parallel to the reflecting surface, the vanishing-points of their reflections coincide with their own.

In Chapter XI it is shown that the perspective of a circle may be either a circle, an ellipse, a parabola or even an hyperbola, according to the conditions under which it is seen. Its perspective also frequently appears quite different from the actual object, when directly observed, thus causing singular distortions in the picture, which become apparent when the picture is looked at from any point other than its true point-of-sight. Methods are also given for obtaining the perspectives of circles in any position.

The next chapter is devoted to a consideration of these curious distortions which frequently appear, to bother the draughtsman, especially in Parallel Perspective. Directions are given for suitably correcting them, so that they may not appear offensive to the eye. These would not be apparent if the picture were only viewed from the station-point employed in its construction. Since the exact location of the proper point-of-view is seldom indicated on a perspective, and is sometimes to be found only with considerable trouble, a perspective drawing must not appear incorrect when viewed from any other point-of-sight, not too far removed from the true station-point. As these distortions increase from the centre of the picture towards its edges, the maximum visual angle subtended by the picture is thereby limited to sixty degrees or two-thirds of a right angle.

These distortions become especially offensive to an educated eye in the case of statues, animals, or human figures, so that these are usually represented in the picture as if each figure were directly observed and really occupied the centre of the view, or as if the perspective plane were shifted so as to be perpendicular to the middle visual ray directed towards that object alone. When such objects are combined with architectural forms or lines, as in the case of a statue and its pedestal, or a group of figures in front of a building, the two kinds of forms are very apt to produce an unpleasant effect in conjunction, so that an artist usually makes the architectural background of his picture as simple as possible, masking and interrupting its lines by groups of figures and similar devices. The real cause of this want of harmony is that the architectural portions are drawn in Plane, and the figures in Cylindrical Perspective. This is doubtless one of the reasons that artists attach far less importance to the study and use of perspective, than do architects. Examples of these difficulties in harmonizing figures and architectural forms in perspective may be seen in almost any good collection of engravings or paintings.

Chapter XIII treats of the phenomena and methods of Cylindrical Perspective, in which the objects are represented on a cylindrical perspective surface, instead of a plane, just as if each object were directly observed and placed at the centre of the picture. This causes the perspectives of long straight lines to appear curved, though this is obviated by making them broken, whenever possible. A much wider visual angle may be employed, as the amount of distortion does not increase from the centre to the edges of the picture. This kind of perspective is naturally employed by an artist, or any person ignorant of perspective, in sketching from nature, since each object is drawn just as it appears when observed directly. If the attempt be then made to correct this sketch according to the laws of Plane Perspective, difficulties are soon encountered, and the conclusion is frequently reached that the laws of perspective do not apply to sketches made from nature.

The subject of the perspectives of divergent or convergent lines, embracing shadows cast by artificial light, is next examined, the phenomena being found to be somewhat similar to those already observed in connection with parallel lines, though the methods to be used are more complex. The theory and practice of obtaining shadows cast by artificial lights are very fully explained, both when the light is in front of the spectator, and also when placed behind him, a much more novel and difficult position. This kind of perspective finds its application in some forms of scene-painting, and in the representation of interiors lighted artificially. It will probably become of considerable importance, on account of the great attention now paid to the designing of interiors, and the ease with which photographs of interiors are now obtained by the aid of the electric-light and dry-plate photography.

In Chapter XV some special practical methods are examined and explained, of which the following are the most important: —

1. The common method, familiar to every draughtsman who has ever paid any attention to perspective, but rendered much more convenient by the use of the perspective plan.

2. The method of Ordinates. Points are located by their space coordinates, which is rather tiresome in its application, though convenient for bodies of irregular form.

The writer has found a modification of this method (suggested in the eighth edition of the *Encyclopedia Britannica*, article "Perspective,") to be occasionally quite convenient in practice, being also a method which could be readily taught to students having little or no previous knowledge of Descriptive Geometry. The positions of the vanishing-points and of the ends of some principal perspective lines of the picture can easily be found by calculations, quickly made by the use of the slide-rule, or of four-place logarithms, and the lines can then be divided by Gwilt's method. Adding to these the use of the perspective plan, draughtsmen would be enabled to draw correct perspectives of ordinary architectural structures, with the least possible amount of preliminary study of perspective.

3. The method of Squaring. This is only required for objects of very irregular plan or form, and consists in dividing the plan into similar squares, which are first drawn on the perspective plan, the outlines of the actual plan being afterwards sketched in by their aid.

4. Adhémar's Method. This comprises certain special features, of which the more important are the following: —

a. Drawing portions of the object in orthographical projection at a reduced scale, then laying off their dimensions at a proper distance behind the perspective plane, where the scale is suitable, instead of laying them off in the picture plane at the same scale as the perspective, then projecting them back to the places where they are required.

b. The use of a perspective plan made on inclined planes. To make this equally distinct in all its parts, it is supposed to be divided into strips of proper width by lines parallel to the ground-line, and these strips are tilted up at increasing angles, thus increasing their apparent width, and the distinctness of the plan thereon.

Professor Ware suggests a valuable improvement, which consists in sinking the successive strips to lower horizontal planes, at the same time elevating the station-point from which each strip is seen so that the edges of the strips appear to coincide, producing a continuous plan. The results obtained are identical with those found by Adhémar's method, and the process is less troublesome.

This method is particularly valuable for obtaining the perspective of an object of complex form and circular plan.

The reverse process, of finding geometrical drawings of an object and its actual dimensions, from a given perspective or photograph, is next explained. It is sometimes possible to do this, but is generally impossible unless some of the actual dimensions of the object or its distance from the spectator are known.

In Chapter XVII is to be found a very convenient *résumé* of the principles and methods previously developed, arranged in convenient form for reference.

Chapter XVIII contains applications of Perspective to problems of Descriptive Geometry, such as are usually encountered in practice, with their solutions, forming a very interesting collection, especially valuable for reference in cases of doubt.

The concluding chapter is devoted to very practical advice as to the proper mode of commencing a perspective, of determining the best proportions of the picture, positions of station-point and object, etc. Some instrumental aids are also described. This portion of the work might have been extended with considerable advantage, the author being so well qualified by long experience to pronounce on the practical value, and describe the uses of the numerous forms of "centrolineads," "perspective lineads," etc., which have been devised by various persons for abbreviating the labor and time required for drawing a perspective, or for obviating difficulties arising from inaccessible vanishing-points, etc. Such information is of value, and possesses great interest to young draughtsmen. It would also serve to answer the periodically recurring question, "How shall I set my centrolinead."

Professor Ware is richly entitled to the gratitude of the profession, for he has produced a very able and scholarly work, as the result of extensive studies and great labor, and which merits the highest commendations, because it is so well adapted to the use of the technical school, as well as to serve as a practical manual for the private study of the draughtsman. It is written in a clear and pleasant style, and the subject is invested with an unusual degree of interest. The plates are well executed, are entirely original, with the exception of a very few figures, and are devoted to architectural subjects. They are also arranged in a separate portfolio, so as to be most convenient for study. Considering the cost of publication, and the great amount of labor required in the preparation of the text and plates, the price of the work is very reasonable. No architect or draughtsman can afford to be without it.

Heating by Acetate of Soda.— The heating of small pits and greenhouses is, in spite of the numberless apparatus in use, a source of trouble. To such folk — and their number is legion — the new plan of heating by acetate of soda seems as if it might be developed into something serviceable. According to an article in *Nature*, the plan is largely adopted on the London North Western Railway for foot-warmers. The duration of heat in a warming-pan with acetate of soda is claimed to be four times that of hot water alone. This is due to the amount of heat required in the first instance to change the acetate of soda from a solid to a liquid state, which heat is liberated as the acetate gradually resumes a solid form. It is stated that only about half the heat is required to produce the same effect as in the case of hot water. The acetate does not require to be renewed except at long intervals. To restore the heat in the pans after cooling, they have simply to be plunged in boiling water for half an hour.

THE LATE AMERICAN ARCHITECT COMPETITION.

REPORT OF THE JURY. — V.

"*NORTH STAR*" [No. 1] has an excellent plan. Note what a pretty effect the stairs would have from the hall. The latter we should have preferred to provide with a vestibule. The china-closet has no light and would have found a better place where the kitchen entry is. This competitor has frankly made a large living-room to serve as dining-room as well, and the parlor is smaller. Four chambers, bath-room and attic-room compactly fill the upper floor. The exterior is judiciously broken up by simple means and has a homelike appearance. The details are carefully designed and well drawn, but the perspective shows a surprising want of skill in the use of the pen in free-hand work. The estimates given are fair, and the house would be worth building at those prices.

"*Domus*" [No. 1] has evidently more practical than artistic experience. His perspective is one of the most unpleasant experiments imaginable — its extreme neatness is not a fault, but is quite unable to redeem its harsh crudeness. The preceding designer failed from his ignorance of free-hand drawing, but that failure was more tolerable than this attempt to line-in everything with the drawing-pen. The detail-sheet is more successful, and the plan is good except for the ugly corner entrance into the sitting-room and the lack of any door into the dining-room from the hall. Upstairs all is well.

The author of the design marked with a monogram of "*Alpha and Omega*" has a good plan; the rooms on each story communicate well; the stairs are economically managed, and though in general it is disagreeable to have them between closed walls, here they are so liberally lighted by a large window that they would escape a dismal effect. We should transpose the position of pantry and china-closet, as the window is most used in the latter, to avoid leaving the door open into the dining-room. The character of the exterior is appropriate, and except a slight complication in the roofs is economical. We commend the neatness and intelligence shown in the sheet of details. This design was received after the prescribed time, and was not counted in the competition.

"*North Star*" [No. 2] has a long, narrow plan with library, parlor and dining-room *en suite*, a liberal disposition which is not, however, satisfactory, inasmuch as the dining-room is only reached through the library. It is a fatal error to make this latter room the only means of communication between the kitchen and front of the house. This might easily be remedied by a door through the china and coat closets to the hall. Upstairs the bath-room and various closets are much larger than is needed. The two chimney-stacks in library and parlor serve no purpose which a single one would not perform. In general this design needs condensing; the length is inordinate.

"*Home*" [No. 2] shows his inexperience in various ways. The outline of the plan is wastefully irregular; the upper hall is without light, except through a skylight which is not indicated. The back stairs are not well combined with attic flight. The bath-room is placed over a landing of the staircase where there is no proper opportunity for carrying down pipes and where a leak would be disastrous. Credit is due for grouping the fireplaces of the three principal rooms of first floor around one chimney, and for convenient communication between the different rooms. The drawing of the perspective and details shows the uncertain touch of inexperience, but there is equally great evidence of painstaking and intelligent labor, which promises well for the future.

"*Promotion's*" design is quiet and rustic, and its plainness is agreeably varied by the porch on two sides, without, however, keeping the sun from the principal rooms. Details and elevations are well drawn. The balustrade of the stairs could only be made with much care and expense, owing to the curves employed, which ignore the natural character of wood. The defect of the plan lies in too large a hall. The common device of letting the upper part of the front stairs, after they pass out of sight of the hall, be joined by the back stairs is here misapplied, for the half-flight from the kitchen joins the main stairway in full sight of the hall and front door. A reduction of the size of the hall would make this design more economical than several of the preceding ones; in fact, it ranks among the best in this respect.

"*Pencillaria's*" design is ingenious and attractive. By careful study he has turned an unpromising scheme into an excellent plan. Room is economized with great skill. An inherent fault lies in having to pass from kitchen to front hall through the dining and living room. The exterior could have been made attractive without the many breaks which now form a serious item of cost, and the outside chimney for the fireplace in the parlor alone is an expensive luxury. This want of self-denial prevents the design from taking rank beside those which have been made attractive by simpler means. The drawing is neat and crisp throughout, but in the detail of the fireplace there is evidently a slip which throws it out of true perspective.

"*Colonna*" presents a novel and ingenious plan kept within a rectangular outline. He has made several marked economies of varying value. Thus, while providing flues, except in the "den" he has no fireplaces. This recourse to stoves would have been less intolerable a generation ago than now. Another economy, which would effectually prevent the house from finding an occupant of the kind intended, is the omission of a bath-room. More successful is the arrangement by which the front stairs meet the back stairs on a common landing projected out as a handsome bay. Nothing indicates the use the space under this landing is put to, and no door nor window opens into what might be valuable space. The elevation, with its gambrel roof, cannot be counted a success; it is clumsy, and the lines do not mass well. The plumbing item of $35 is of course too low, and to this should be added the cost of a well-appointed bath-room. The drawings are treated with a spotty exaggeration of light and shade which defeats its own purpose.

"*M. N.*" (*see illustrations*) challenges attention with his quaint old farm-house, which has many good features. A critical eye is at once struck with the discrepancy between the stud of the main house and that of the L. The second-story chamber in the L must be very low-studded — indeed, it does not seem possible to approach the narrow frieze of windows except on hands and knees. The plan has been well thought out; the dining-room and parlor open widely together, and the chambers are well placed. The drawings reveal a skilful hand, and the details designed are suitable to our modest programme.

"*Try*" was unfortunately received too late, or he would have taken one of the first places in the competition. His plan is complete, and yet covers a very small area. Not an inch is wasted, and there is no sense of pinching in the cheerful circulation offered, except in the dining-room; for this room nine feet is too narrow, and a bay should have been thrown out from it instead of from the parlor, which, having light on two sides, could well dispense with the bay. The only fireplace is in the parlor. The elevation is unusually attractive, from its mullioned windows and overhanging double gables, but these latter are far from economical; for the cost of their framing and the flashing needed in the valley, the roof could have been carried up high enough to give rooms for servants in the attic, who now must occupy one of the four bed-rooms on the second floor. While the detail-sheet shows simple and refined work, within our limits of cost, the perspective shows carving or moulding in numerous panels, of which no mention is made in specifications or in the estimates. The drawing is of the utmost brilliancy.

"*Orioles*" has evidently spared no pains to make his design attractive. He must count it his misfortune that his accessories, human and animal, do not impress the jury in the way that his ingenuous spirit expected. The programme had nothing which suggested a Noah's ark, nor were the children of Ham required in evidence thereof. However, as the fervent imagination of this competitor has not overlooked practical questions, it is but his due to say his plan is conveniently arranged in detail. It is a severe drain on our appropriation to place the kitchen and laundry in the basement, where a generous wine-cellar is quite out of place; but, as the area covered by the plan is small, this basement story might in some situations be a very proper expedient. The natural gable end of the house is hipped back to form a small gable in the attic, uncovering a chimney against the outer wall in a most awkward way. Let "*Orioles*" make his experiments in *genre* subjects elsewhere than on the sheets of his architectural drawings, and he will later in life be better pleased with himself.

The design with the device of a "*Crescent Moon*" is so excellent in detail that it requires little criticism. It ranks among the best, but did not have the distinction of treatment which characterized the first three or four designs. It could be built about as it stands with credit to its architect and satisfaction to the owner.

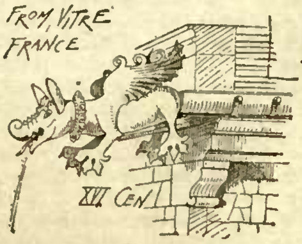
"*Mead's*" plan is better than his elevation, which is one of the worst in the competition, showing either utter inexperience or else ignorance of good models of architecture. Note the monstrosities which do cumbrous duty as supports to the light piazza roofs. There is no evidence of the designer having read the programme. Besides having a plan with four principal rooms below and a very large hall, he has a brick first story carried out even in the L. Five times the sum allowed would not suffice to erect such a building — even without an architect — and we trust "*Mead*" will make much progress on paper before he is intrusted with the simplest bit of design.

In closing this report the jury gladly bears witness to the earnest spirit in which the great majority of the competitors have met the requirements of the programme. If there have been errors of judgment in details of probable cost, if inexperience has suggested ambitious features sometimes, still the effort has rarely been to avoid an honest solution of the problem, and such efforts should go before the public as suggestive and useful data for a class of buildings which need careful attention.

H. W. HARTWELL,
EUGENE LETANG, } Jury.
ARTHUR ROTCH.

AMERICAN WOODEN CHURCHES. — In his new volume on American topics Mr. Freeman, the historian, makes the following observation on ancient wooden churches that came in his way while he was here: "I have seen old-fashioned wooden churches in America for whose details of course there was nothing to say, but whose general effect was a good deal more venerable than that of an ancient English church on which a modern architect has been let loose to play his tricks."

THE $3,000-HOUSE COMPETITION. — XI.



SPECIFICATIONS of material to be used and labor to be performed on dwelling-house for young man of unexceptionable position, by "*M. N.*"

Excavate where necessary.

Cellar walls and Foundation of field stones, laid dry, pointed with strong lime-mortar; underpinning of handsome stone, solid in mortar; rubble drain under walls.

Cesspool of stone; stone cap with man-hole. Vitrified drain-pipe with traps, put together with cement.

Chimneys and Piers hard-burned bricks, bottom courses in cement; top of chimneys selected bricks, laid in red mortar.

Fireplaces and Hearths of face-brick in red mortar. Plaster chimneys inside and outside to roof.

Frame, good spruce of sufficient sizes.

Floorings bridged. Truss openings and where necessary.

Walls and Roofs covered with good spruce. Under floors good spruce. Cover walls, roof, and under floors with thick sheathing-paper.

Plaster, two-coat work.

Outside Finish, good pine stock.

Flash thoroughly for tight job.

Shingles, sawed cedar (clears), on walls and roofs.

Piazza floor, narrow hard-pine.

Floors:— Upper floors of Hall, Parlor, Dining-Room and Kitchen, narrow rift hard-pine; principal chambers, matched white-pine; other floors spruce. Inside finish, best quality white-pine.

Closets: — China-closet fitted with shelves, drawers, cupboards and glass case. Pantry with drawers, bins and shelves. Other closets with shelves, strips and hooks.

Hardware, $2.50 per door on average.

Stairs, main flight, hard-pine treads and risers; rest white-pine; cellar stairs, spruce treads and risers.

Doors:— Front, 2" thick; principal on first story, 1¾" thick, six-panelled; others, four-panelled; closets, 1¼" thick, flush mouldings.

Window-frames, 2" sills, hard-pine pulley-styles, sashes 1¾" thick. Cellar windows hung with butts, glazed with double-thick American glass. Blinds on all windows practicable.

Plumbing:— Kitchen sink, bath-tub and water-closet properly ventilated and drained.

Painting:— Trimmings, two coats lead paint; shingles, two coats stain. Hard-pine floors, one coat of preservative. Inside finish, one coat stain, two coats shellac.

Cellar only under "L."

ESTIMATE OF QUANTITIES AND PRICES RULINO AT BOSTON.

Item	Price	Item	Price
10,000 ft. frame and partitions..	$170.00	Stairs..........	$100.00
7,500 ft. covering and under floors..........	123.75	Nails, 800 lbs..........	43.00
600 ft. outside finish..........	30.00	Sheathing-paper, 500 lbs..........	25.00
1,050 ft. hard-pine floor..........	57.75	Lead and zinc..........	15.00
1,200 ft. white-pine floor..........	66.00	Painting..........	175.00
400 ft. base "running foot"...	40.00	Plastering..........	250.00
1,300 feet inside finish "running foot"..........	80.00	Mantel allowance..........	50.00
28 M. shingles..........	126.00	Excavation..........	20.00
1 dormer..........	30.00	Stone-work..........	80.00
27 windows and blinds..........	216.00	Brickwork..........	150.00
5 closets..........	25.00	Plastering grounds and beads...	20.00
China-closet and pantry..........	40.00	Labor..........	750.00
3 cellar windows..........	6.00	Plumbing..........	200.00
24 doors..........	192.00	(Estimated by competent builders)..........	$3,155.50
Piazza..........	75.00	Architect's commission would be	150.00

WATER-CLOSETS. — XII.

TYLOR'S *Pan-Closet.* — Tylor & Son, of London, invented in 1878 a pan-closet receiver in which the trap and receiver were combined in one piece, both being above the floor. In this closet there is an inspection-hole in the crown of the trap, but no vent-pipe. The same firm manufacture an earthenware container, which is yellow on the outside, and glazed with white on the inside. The top or cover to this container, and to which the mechanism is attached, is composed of galvanized iron; having the working parts connected with top of the receiver, the opportunity for breaking the earthenware portion is lessened.

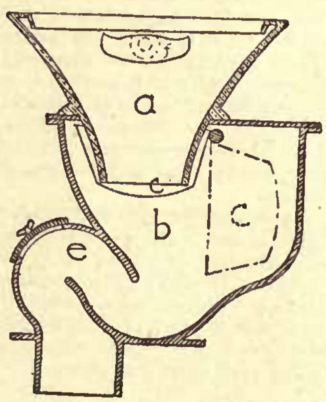


Fig. 116. — Tylor's Pan-Closet.

a, Bowl. *b*, Receiver. *c*, Pan. *e*, Trap. *f*, Fan.

These manufacturers also have a patent for a sprinkler to be connected with the container of a pan-closet. The sprinkler is divided into two branches, and is carried partially around just below the top of the container. In it are a row of small perforations. The sprinkler is connected with the supply-pipe, and when the water is turned on to flush the bowl, small jets of water are thrown against all sides of the receiver, from the different perforations. No doubt such a device would be of some service, although I have little confidence in an arrangement placed as this is, out of sight and out of mind. The pipe would corrode and collect the spatterings from the container. A pan-closet with an earthenware container, that has a flushing arrangement and is properly ventilated, the pan being opened or shut by a simple crank and held in position

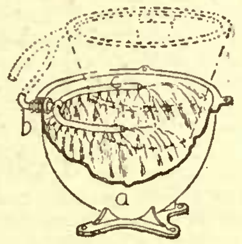


Fig. 117. — Container and Sprinkler.

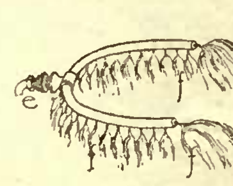


Fig. 118. — Sprinkler.

Tylor's Pan-Closet.

a, Receiver or container. *b*, Supply-pipe. *c*, Sprinkler. *e*, Coupling. *f*, Jets of water.

by a weighted lever, would probably form one of the best arrangements for a closet of this class. Underhay, of London, also supplies a white earthenware container with the pan-closets which he manufactures, when there is a call for them. It seems remarkable, when their faulty construction is considered, that such a large number and variety of these closets should have been used in this country.

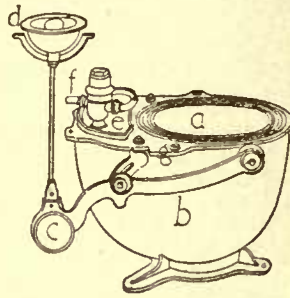


Fig. 119. — Bartholomew's Closet.

a, Pan. *b*, Receiver. *c*, Weight. *d*, Saucer. *e*, Place for drip. *f*, Supply. *g*, Top of receiver.

Bartholomew Pan-Closet. — The Bartholomew closet takes its name from the supply-valve, which was patented in 1854–1858. This closet, if the number used were a correct criterion, might be considered one of the best of the class. I give the illustration of this closet as it is manufactured by Henry Huber & Co., of New York; it has a simple weighted lever, pan, container and bowl. The supply-valve, on which the novelty is claimed, is screwed to the top of the container, and has a dish or basin formed by a rim raised on the top of the container, to catch any leakage from the supply-valve.

The "Monitor" Closet. — The same manufacturers supply a closet patented by W. S. Carr in 1872, under the name of the "Monitor" closet, which has a piece bolted to the side of the container, that can be easily removed. This is intended to be used in case the pan should need repair, or the container need cleaning out, contingencies which may be looked upon as certainties. "All the trouble of shutting off the water, taking down the seat and detaching the bowl from the top of the receiver is avoided." In the last-mentioned closets the bowl is simply set on the receiver, the bottom projecting through the hole made for the purpose. There is no arrangement for screwing or clamping to the receiver. The "O. I. C." closet is the "Monitor" closet without the removable plate.

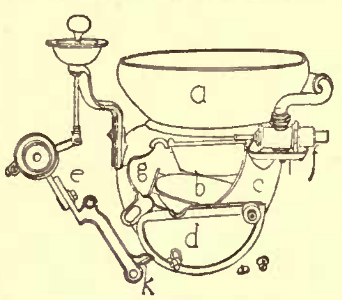


Fig. 120.

"Monitor" Closet with side-piece removed.

a, Bowl. *b*, Pan. *c*, Container. *d*, Removable piece. *e*, Adjustable weighted lever. *f*, Supply-pipe and valve. *g*, Spindle. *k*, Stud for operating supply-valve.

In the illustration of the "Monitor" closet, one of Carr's supply-valves is shown in position. Huber & Co. supply these closets with the receivers tarred, zinc-coated (galvanized), or enamelled, and they may be attached to a tank or cistern, instead of directly to a water-main, for the supply to flush them. Vent-couplings are also furnished, when desired, that can be connected with the top of the receiver by means of threads cut into the top of the receiver, into which the brass coupling may be screwed, and a lead pipe soldered on it. The lever in the "Monitor" Closet is made so it can be adjusted to different lengths.

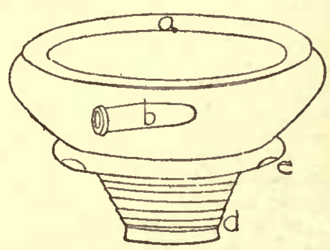


Fig. 121. — Circular Bowl.

Harrison's Pan-Closets. — Chas. Harrison, of Philadelphia, manufactures a number of pan-closets that differ from each other in the position or mechanism of the supply-valve, or in the weighted lever. Harrison furnishes with his pan-closets, when desired, a pan made of rubber, of which he says: they "are non-corrosive, and are impervious to acids."

Bowls are manufactured for pan-closets in a variety of shapes, and it seems appropriate to give a description of the different forms in connection with this class of closet, although the same style of

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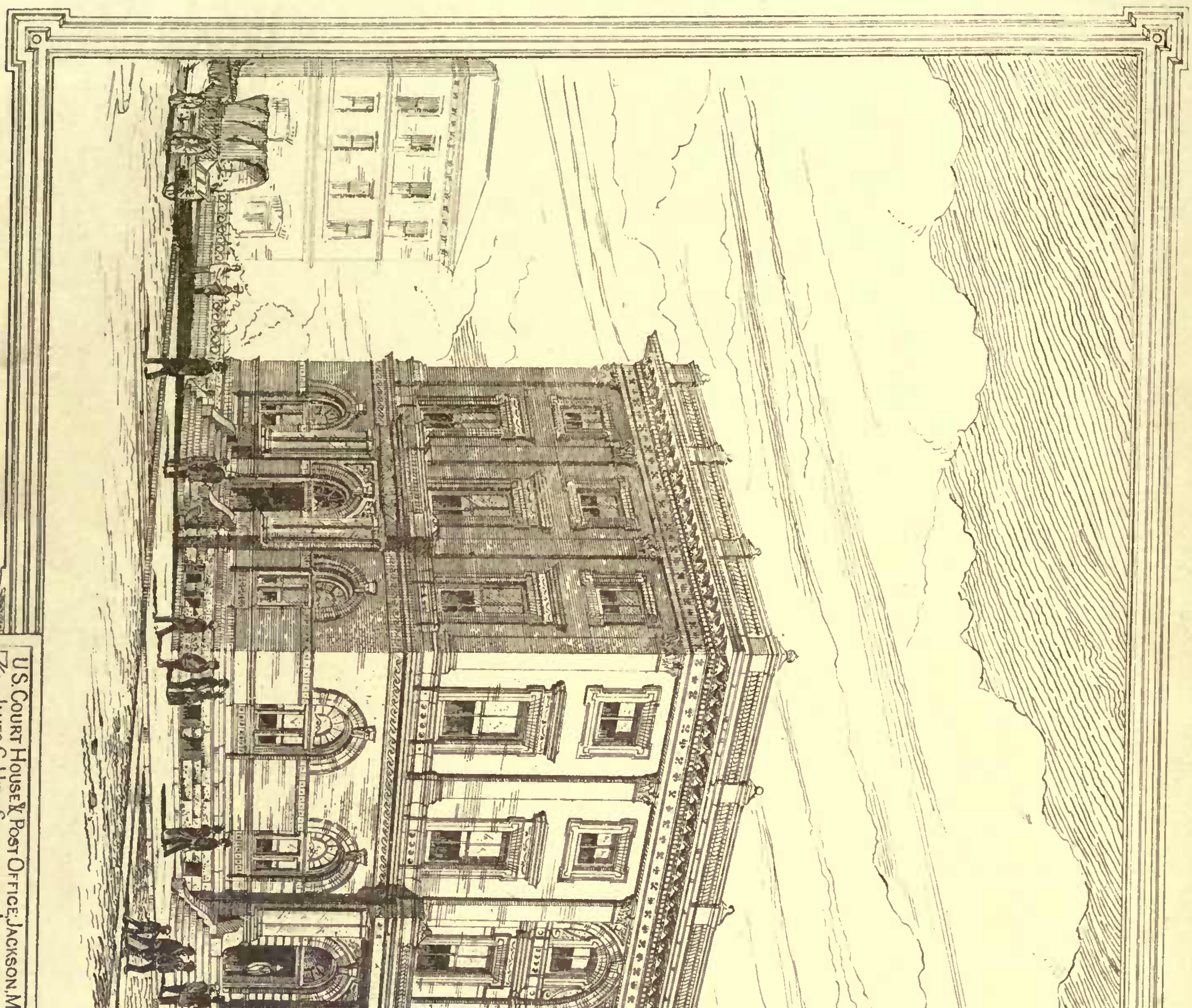

U.S. COURT HOUSE & POST OFFICE; JACKSON, MISS:
JAMES G. HILL, SUPERVISING ARCHITECT:
TREASRY DEPARTMENT.

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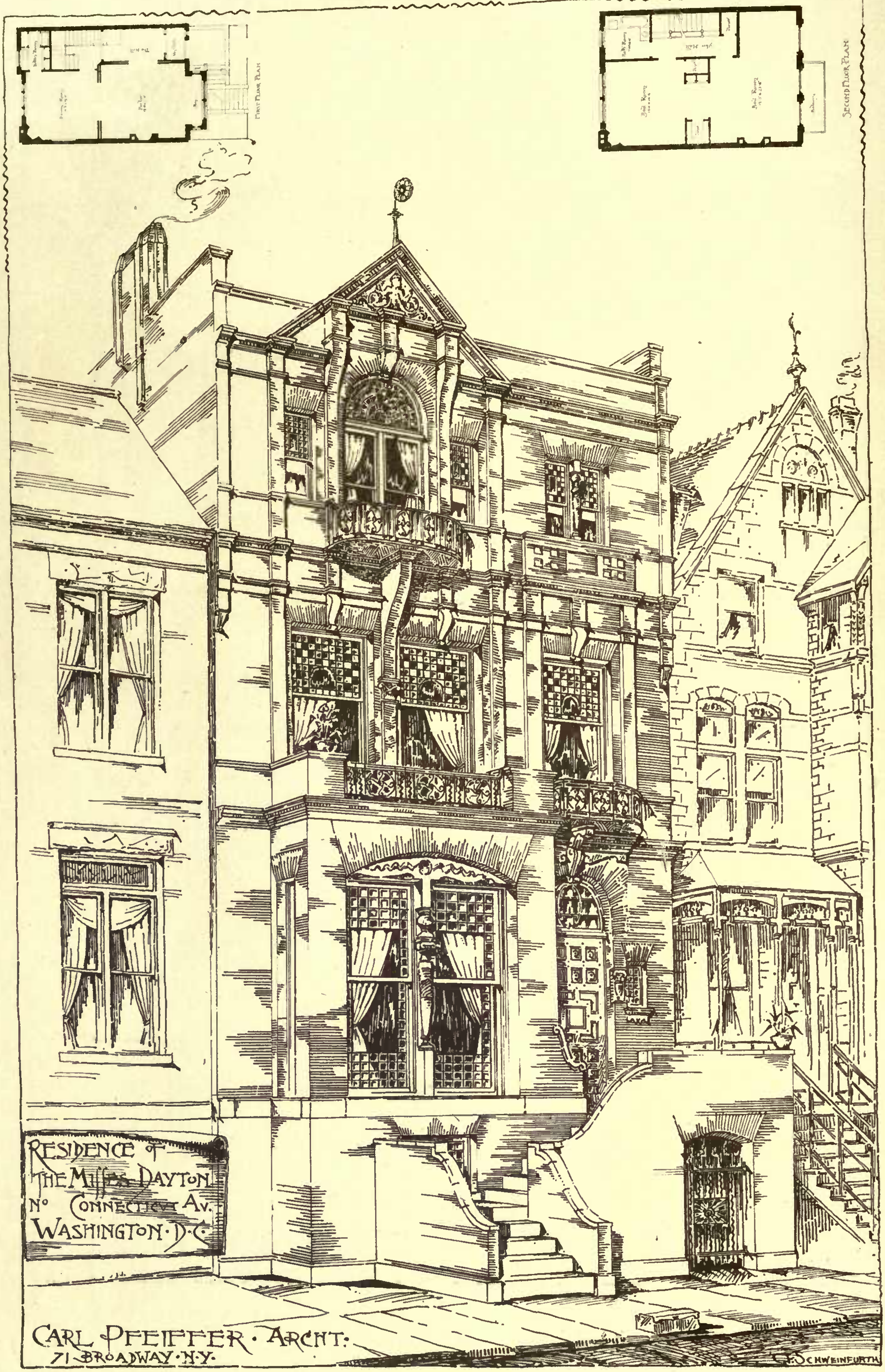

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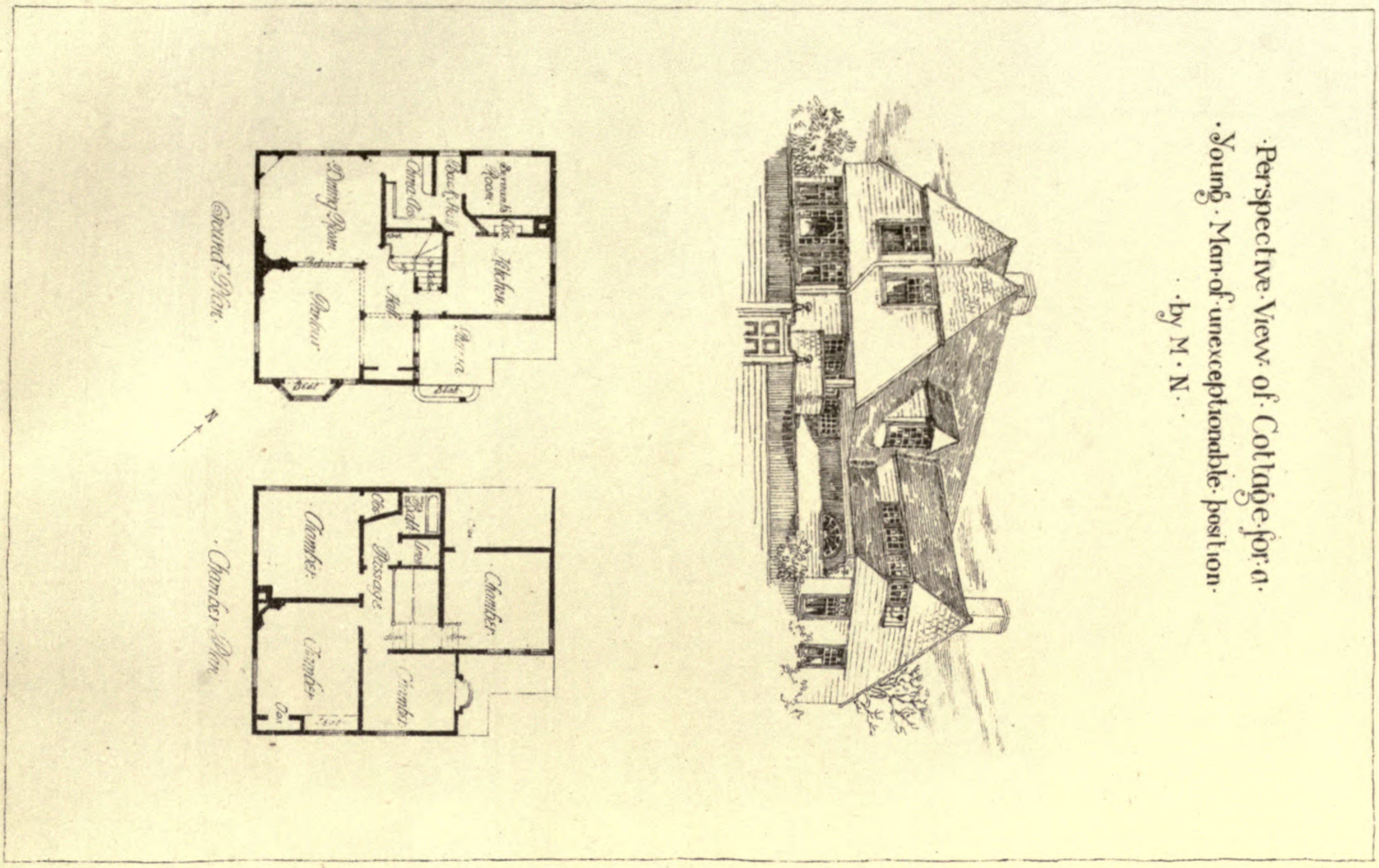

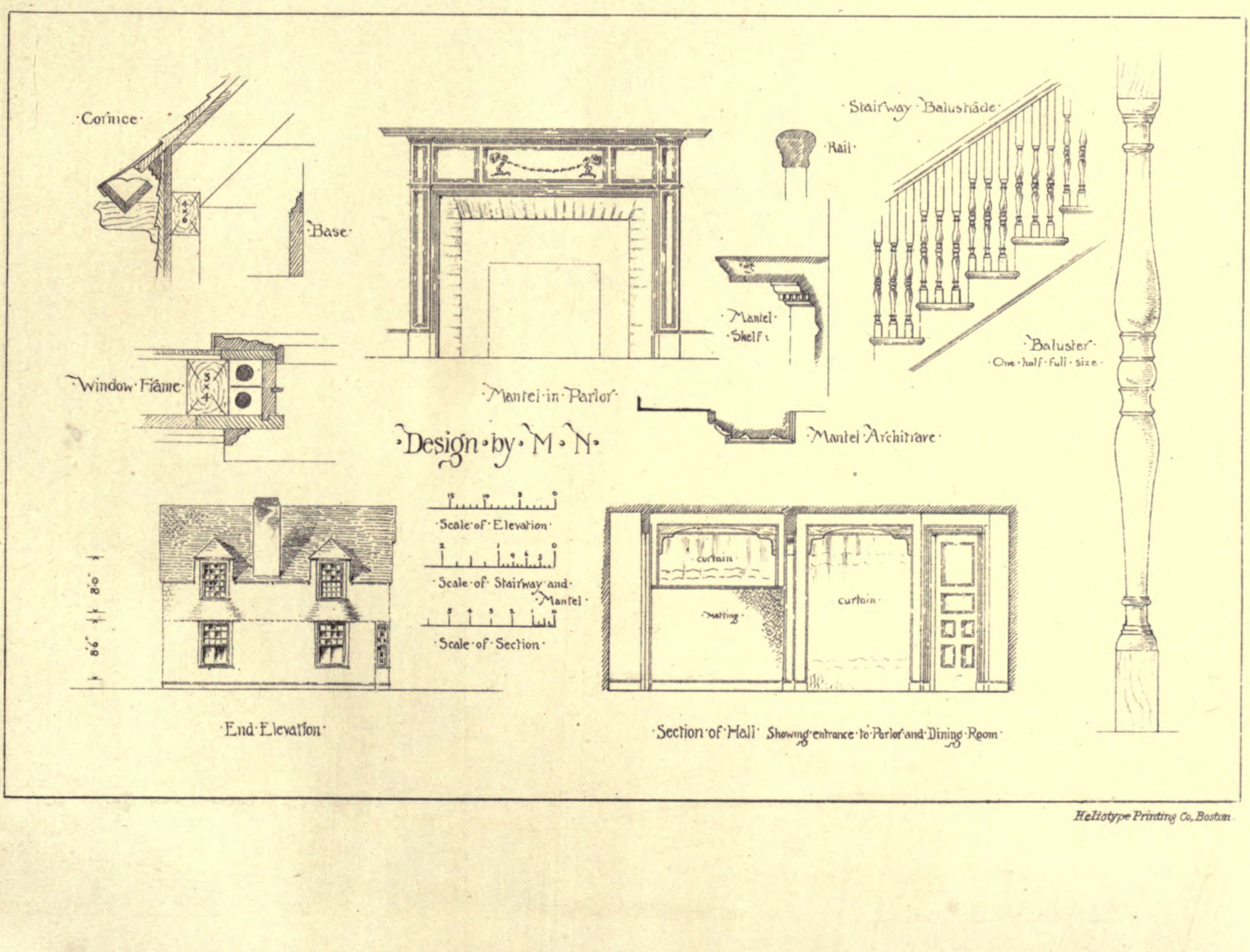

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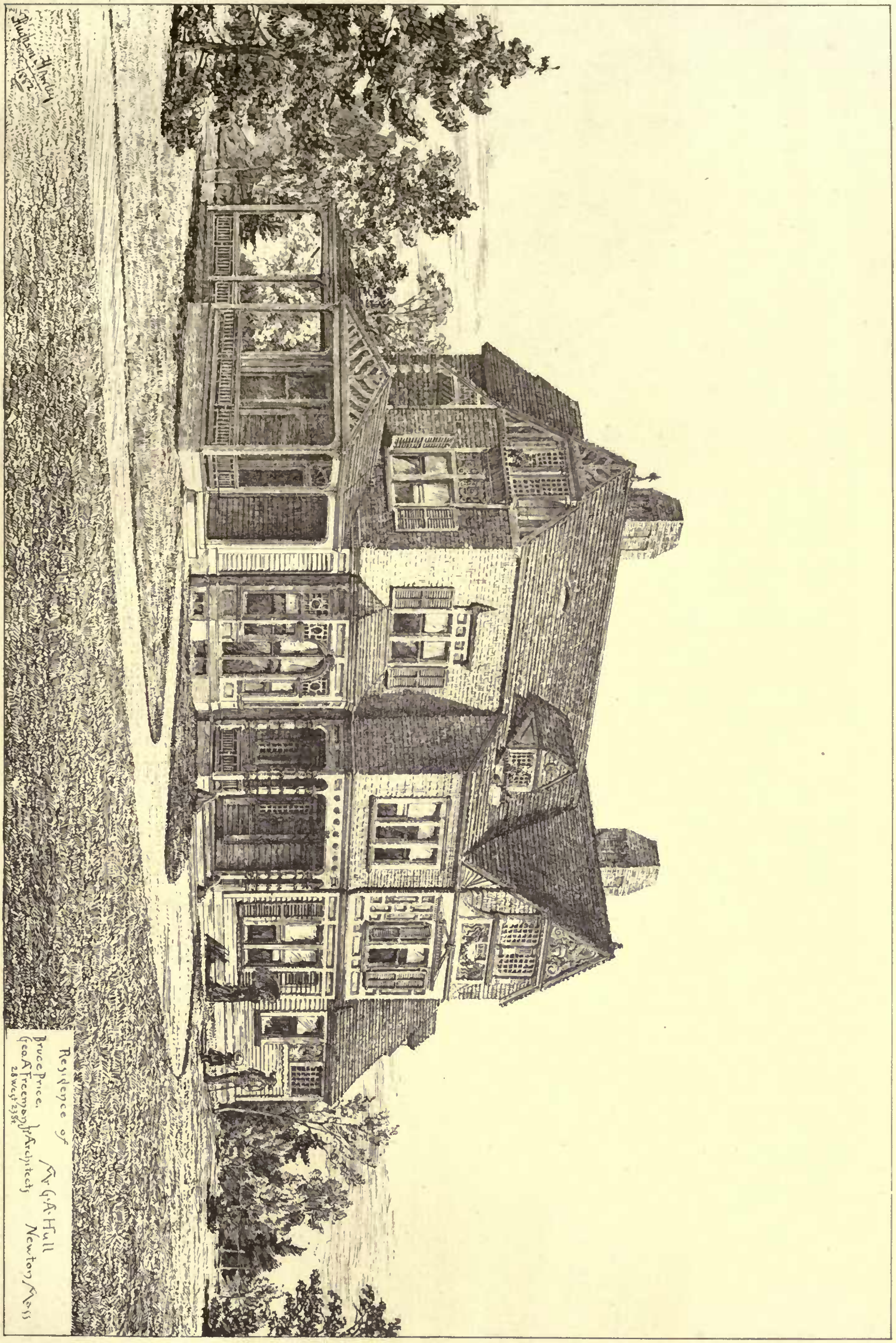


Residence of Mr G. A. Hull Newton, Mass.
Bruce Price. Geo. A. Freeman Jr. Architects
28 West 23rd

Heliotype Printing Co. 211 Tremont St. Boston

bowls are sometimes used in connection with iron hoppers, and properly come under the head of hopper-closets.

Pan-Closet Bowls. — The most objectionable, as well as the most common form of closet-bowl is circular. The water to flush the bowl comes through an opening a little less than half an inch in diameter, when the lead pipe has been inserted into the earthenware orifice made for the purpose. The water when turned on forms a puny, spiral stream, that does little if any good in flowing around the sides of the bowl. These bowls are sometimes furnished with flushing-rims. There are conical bowls in which the supply of water is brought in at right angles with the circumference, the water being spread over the surface by means of a fan of metal screwed on the bowl. The orifice in which the lead pipe is inserted is generally an inch and a quarter in diameter in this form of bowl. These bowls are manufactured with an opening near the top, in which a pipe to ventilate the bowl of the closet may be inserted.

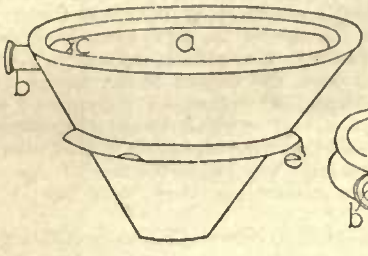


Fig. 122. — Oval bowl.

a, Flushing-rim. *b*, Orifice for supply-pipe. *c*, Vent. *e*, Rim to rest on top of container. *d*, Portion of dip-into-pan.

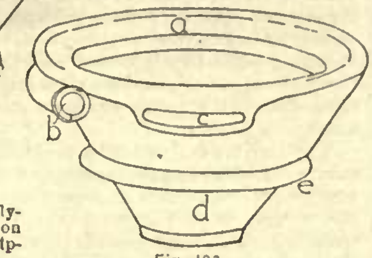


Fig. 123.
Oval bowl with Vent and Flushing-rim.

Fig. 124. — Old.

Fig. 125. — New.

Ship Closet-bowls.

There are two kinds of bowl manufactured for ship-closets, both of which are sometimes used in connection with valve-closets. One is conical, the other is hemispherical. The Enterprise Pottery Company make what they call a square French closet-bowl. This bowl has a flushing-rim, and answers for a drip-tray safe and a slop-sink as well as for a urinal.

THE ILLUSTRATIONS.

TOWN-HALL, NORTH EASTON, MASS. MR. H. H. RICHARDSON, ARCHITECT, BROOKLINE, MASS.

[*Gelatine Print.*]

THE walls of the tower and first story are of a local granite, of a warm reddish tinge, and the cut-stone throughout is Longmeadow. Red Akron tiles cover the roof; the upper walls and chimneys are of red brick. A large hall 75 feet long (including stage) by 46 feet wide, occupies, with dressing and cloak rooms, the second floor; above is a Masonic Hall, below a smaller hall and rooms devoted to various uses. The building is approached by a broad flight of brownstone steps winding about, to take advantage of the rocky nature of the site.

COMPETITIVE DESIGN FOR A $3,000-HOUSE SUBMITTED BY "M. N."

FOR criticism of this design, see the Jury's Report, elsewhere in this issue.

SHOULD any of our non-professional readers desire to build according to this design, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

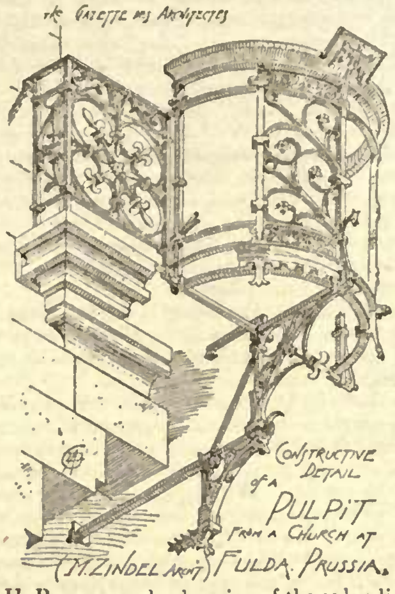
HOUSE OF G. A. HULL, ESQ., NEWTON, MASS. MESSRS. PRICE & FREEMAN, ARCHITECTS, NEW YORK, N. Y.

UNITED STATES COURT-HOUSE, JACKSON, MISS. MR. J. G. HILL, SUPERVISING ARCHITECT OF THE TREASURY DEPARTMENT.

RESIDENCE OF THE MISSES DAYTON, WASHINGTON, D. C. MR. CARL PFEIFFER, ARCHITECT, NEW YORK, N. Y.

A DUELLISTS' RENDEZVOUS. — The demolition of an ancient house in the Rue du Jour to make room for the new Paris Post-Office recalls the strange use to which it was put two hundred years ago, when it was owned by Francois de Montmorency, Comte de Boutteville, and known as the Hotel de Royaumont. This eccentric nobleman was pleased to make it the rendezvous of all the duellists in Paris, and every morning gentlemen who had contrived to pick quarrels over night met there to settle them. The Count received them hospitably, furnished them with the weapons of their choice, with a surgeon, and with a room to fight in, and afterwards entertained the survivors at a late breakfast. This genial mode of life was finally interrupted by a couple of inconsiderate ladies who succeeded in killing each other in the *salon*. The police thought that this was a little too much and obliged the Count to close his hospitable mansion.

ORGAN-CASES AND ORGANS.[1]



THAT so little study should have been given to the subject of organ-cases by the architects and archæologists of the "Revival" is indeed strange. It is true that the elder Pugin designed very elegant organ-cases for Jesus Chapel, Cambridge, and Ushaw College, near Durham (the latter was never executed), and that several good cases have recently been erected from designs of the late Sir G. Scott, Mr. G. F. Bodley, A. R. A., Mr. Somers Clarke, and the Rev. F. H. Sutton; also that we have had publications upon the subject by Mr. Sutton and others; that papers have been read before the Architectural Association by Mr. Somers Clarke and Mr. H. H. Brewer, and a drawing of the splendid old organ-case in the Cathedral of Hertogenbosch (Bois-le-Duc), by the last-named gentleman, accompanied by remarks upon ancient cases existing in Holland and Germany, was published a few years back in the *Builder;* yet it may certainly be said that no single article of church furniture has received so little attention, and for this reason alone, if for no other, we gladly welcome such a work as that by Mr. Hill, just now published. But when we add that the book in question is carefully written, and illustrated by nearly forty photo-lithographs, folio size, reproduced from drawings made specially for the work by Mr. Hill himself, and that many of the organ-cases sketched have never before been illustrated, the great value of the book both to the professional architect and the archæologist can scarcely be over-rated. It is, in fact, the only "text-book" upon the subject yet published, and thus supplies a want which has long been felt by all who have had their attention called to this very important and necessary article of church furniture.

What at once strikes us in turning over the leaves of Mr. Hill's handsomely got-up volume is the extraordinary variety displayed in the ancient designs, the perfectly marvellous originality, and almost endless power of invention displayed by the Mediæval and Renaissance architects in their treatment of the organ-case. In fact, their remarkable versatility and power are nowhere more conspicuous, and what makes the matter somewhat remarkable is the fact that nearly all the existing examples date from a period which we are in the habit of regarding as marking the decline of art.

The earliest organ-case supposed to exist in any European church is to be seen at Sion, in Switzerland. Mr. Hill considers that it dates from the close of the fourteenth century. The instrument is small, only about twelve feet high and six feet wide; the pipes are arranged in two square "towers," and a gable situated between them. The "shades" are formed by compositions of rather elegant curvilinear tracery. The front of the organ is provided with shutters richly painted, the subjects depicted being Our Lord and St. Mary Magdalen on one side, and St. Catherine kneeling before the Virgin Mary and the Divine Infant on the other. The lower portion of the case is plain in construction, but painted with a kind of scroll pattern. It will be noticed that here, as in nearly all the organ-cases illustrated and described by Mr. Hill, the upper portion of the case is bracketed-out at the sides, over the lower portion or "trunk" of the organ. The next example in point of date is the Church of Alcala de Henares, in Spain. This is a rather larger and more elaborate case than that at Sion. The front is composed of a central tower and two "flats" filled with pipes, and crowned by three open-work spires. Like the Sion example, we have here also the shutters or doors, but no decoration is shown upon them. Unlike the Sion case, however, this is not bracketed over at the sides, so that the "trunk" and upper portion of the case are of the same width, and a comparison of the two designs will, we think, convince every one how much the Sion case gains by this treatment. The only other mediæval case illustrated by Mr. Hill which does not possess this bracketing-out is the grand case of the organ in Perpignan Cathedral. Now as Perpignan was formerly in Spain, and as these are the only two cases illustrated from that country, it seems probable to us that the absence of this very general feature is a peculiarity of Spanish organ-cases. Mr. Hill speaks highly of Spanish organ-cases, but we must confess that we like the two Spanish examples less than most others given in the book. The absence of the corbelling, or bracketing-over at the sides, gives the instrument a square, heavy, clumsy look.

The cases at Sion and Alcala both enclose very small instruments, but as the size and requirements of the organ demanded greater

[1] *The Organ-Cases and Organs of the Middle Ages and Renaissance.* By A. G. Hill, B. A., F. S. A. A book-review published in the *Builder.*

space, the mediæval architects were quite prepared to meet the demand upon their powers of invention, and we find towards the close of the fifteenth century the truly magnificent organ-cases of Dortmund and Strasbourg. The former is one of the most valuable examples given by Mr. Hill; it consists of three large semi-circular towers, separated by flats; the upper portion of the case very boldly corbelled-out at the sides; the pipe-shades are finely carved with pierced foliage, and the whole is crowned by lofty open crestings. The trunk is richly panelled and carved, and the whole is supported upon a surprisingly rich wooden gallery. The organ-case is thoroughly Gothic, but the gallery has a touch of Renaissance about it. Mr. Hill considers the two to be of about the same date, but we cannot help thinking that, although the projecting semi-hexagonal portion of the loft may be coeval with the organ-case, the two flat portions at the sides are some half-century later.

What makes the Dortmund case so interesting is the fact that it would exactly adapt itself to our present wants; it could, in fact, contain a moderately-sized organ, just such a one as would be required in an ordinary parochial church.

A few years later in date than the Dortmund case is the magnificent example in the Marienkirche at Lübeck, an immense instrument, eighty feet high and forty feet wide, enclosed in a case adorned with a profusion of splendid tracery, carving, and decoration, filling up the whole west end of the church. We often, now-a-days, hear architects complain that they have to accommodate large organs in their churches; yet in the year 1504 the old German architects or builders were not daunted at having to find room and to design a case for an instrument at least four times the size of those over which our present architects raise such difficulties. Mr. Hill very properly does not confine his descriptions and illustrations to Gothic organ-cases, but carries his subject down through the Renaissance period to the year 1740, the latest example in point of date being that from the Cathedral of Würzburg, in Bavaria. The numerous superb Renaissance examples given must justify the course pursued, even to the most exclusive admirers of Gothic architecture. Grander examples of church furniture than the great Renaissance organ-cases of the Cathedrals of Le Mans, St. Brieuc, and Hertogenbosch, or those from the churches of Argentan, Caudebec, St. Bertrand de Comminges, Augsburg, and Stralsund, could not be conceived, and it is certainly deeply to be regretted that either the opportunity or the ability to design such works appears to be now wanting. As Mr. Hill observes, nothing can be imagined more dismal and wretched, both in point of design and construction, than the general run of organ-cases erected in our churches and music-rooms. The author makes some remarks upon this subject which we will quote in his own words: —

"The present Gothic revival has practically done nothing towards promoting a more intimate knowledge of the true characteristics of these ancient works of art (organ-cases), for the modern Gothic case is nearly always the most miserable caricature of mediæval work; and as for Renaissance examples, they are almost invariably considered out of place in a Gothic church, and are thus never studied with a view to their being adopted as models for architects of the present day. . . . Many good organs were built in England during the seventeenth and eighteenth centuries, and good cases were made to enclose them, and yet it can scarcely be denied that at the present time the organ-case is one of the most miserable and inconsistent pieces of work that has resulted from the late revival of ecclesiastical art. It is very rarely that any attempt whatever is made to surround the instrument with wood-work of architectural importance, but when this is the case, complete failure is almost invariably the result, through want of knowledge, on the part of the architect, of the true principles which govern the beautiful designs exhibited by these ancient examples of wood-work."

Of course, as Mr. Hill points out, there are others who are still more to blame than architects, and these are those bodies called "organ committees," who, anxious to get all they possibly can for their money, simply accept the tender of that organ-builder "who can *give them the greatest number of stops*." There are, however, numerous other reasons for the present very unsatisfactory state of things, to which we will allude, and the principal one is certainly the present practice of bundling away an organ into a dark hole at the side of the chancel, called an "organ-chamber!" As long as the organ was placed in the western gallery, the authorities knew that an organ-case was necessary and *must be paid for;* but directly the organ is hidden away in one of those abominations called the "organ-chamber," it is obvious that any ornamentation or carving is simply thrown away, and this has led by degrees to the absurd notion that "a church-organ ought not to have a case at all," and the present four-post-bedstead arrangement has come to be looked upon as something very "chaste" and "elegant," instead of being regarded, as it ought to be, as a mean, paltry makeshift; but so attached have some people become to this "four-poster" arrangement, that even when money is given for an organ-case, it is too often expended in sticking up angels on the top of the posts, a few wriggles of brass or iron work in between them, and painting the pipes in lollypop patterns. A most ridiculous superstition has seized people that it is *wrong to put a cornice or canopy over the top of the pipes of an organ!* And thus in nearly all new organs we see the tops of the pipes exposed, forming a most hideous outline, and giving the spectators the impression of an instrument in course of destruction. Now if there is one thing which the ancient designers insisted upon more than anything else, it is that the instrument should be crowned by a canopy or a cornice, and there is no single example of an ancient stationary organ where this feature is wanting. The exquisite Gothic organ-case at Jutfaas, in Holland (of which Mr. Hill gives a remarkably careful drawing), is crowned by a mass of magnificent canopy-work nearly double the height of the organ itself.

Although in some examples the tops of the pipes are visible, yet they always have a shade and cornice above them, so that the pipes never by any chance whatever form the outline of the top of the organ-case. The reason is evident. An organ-case is supposed to *enclose* an organ, and not to be a rack or stand for the pipes alone. It should be distinctly understood that the cornice or canopy above the pipes of an organ does not in any way injure the tone of the instrument, but on the contrary rather improves it, if properly arranged.

The fact must also not be overlooked when considering the difficulties of obtaining well-designed organ-cases, that organists and organ-builders both begrudge every farthing of money spent upon the outside of the instrument. We have often ourselves, when speaking about organ-cases, heard organists make some such exclamation as the following: "Oh, bother your crockets and cornices; give me a good open diapason on the great, or a fine reed on the pedal!" Of course this is all very narrow-minded, but we have all heard the expression "There's nothing like leather."

If we are ever again to have fine organ-cases, one of two things must take place — either we must return to the western organ-gallery and have the choir and organ in the old-fashioned position, or some other important situation must be found for the instrument. Mr. Statham has proposed a shallow transept, and Mr. Brewer would place the organ upon an open arch between the nave and chancel. Mr. Somers Clarke has placed the organ in St. Martin's, Brighton, in a gallery corbelled-out at the side of the chancel, and the arrangement well suits the church in question, but this could only be done in a very wide and spacious building. All those gentlemen who have given special attention to this question agree in denouncing and condemning the organ-chamber, yet we fear it will be years before we get rid of this most unfortunate feature of modern ecclesiastical architecture. Not only has the organ-chamber led to the abandonment of the organ-case, but it has become a most costly substitute for it. People are apt to say, "Yes, an organ-case is certainly a handsome piece of furniture, but then, you see, it costs a good deal of money." Now, it never seems to suggest itself to people who speak in this way, that an organ-chamber also costs a good deal of money. They seem to forget entirely that the walls, windows, arches and roof of an organ-chamber cannot be constructed for nothing; there can, in short, be no doubt whatever that the money now expended upon an organ-chamber would amply suffice for a very magnificent case.

Not only are we now neglecting the construction of organ-cases, but we are absolutely, according to Mr. Hill, destroying ancient ones. A remarkably fine fifteenth-century Gothic case, at Rhenan, near Utrecht, has only just been pulled down, and the noble Renaissance organ-case at St. Mary's, Dijon, is being taken away, and even in England numerous examples of excellent Renaissance work have been destroyed or removed within the last few years. This is the more to be regretted because this country is very poor in examples of old organ-cases. The solitary mediæval example which we possess is at New Radnor, in Wales, and there are only two or three Early Renaissance cases to be found. They exist at Tewkesbury Abbey and Framlingham Church, Suffolk. Mr. Hill illustrates the organ-case at Gloucester Cathedral, the choir-front of which dates from the year 1579, and is therefore one of the earliest examples remaining in England; also King's College, Cambridge, which dates from the year 1605, and Exeter Cathedral, 1665. The old organ at Hatfield House, which is contemporary with that of King's College, Cambridge, is mentioned by Mr. Hill, and one or two others which were in existence a few years back; but whether they have been improved or "restored" away is doubtful.

We may mention that Mr. Hill has given a list of the stops of several of the most celebrated organs, especially that of Harlem, and also an historical chapter, which is of considerable interest, though this portion of the work is kept down, as the subject has been treated at considerable length by Hopkins and Ranbault and other writers. The fact must not be overlooked that Mr. Hill comes before the public as a thoroughly practical writer, who is able to speak from personal experience, as he is one of the representatives of the oldest firm of organ-builders in this country. Hitherto when artists or archæologists have advocated the external adornment of the organ, and placing the noble instrument in a conspicuous position, they have been looked upon as dreamers — as men without practical experience, who would sacrifice the inside of the instrument to mere external embellishment; but here is an organ-builder of vast experience, a member of a firm which has supplied our churches and chapels with organs for nearly two centuries, strongly advocating the most minute attention being given to the designing of the organ-case. Surely this ought to convince "practical people" that, even from their own practical point of view, the matter deserves attention. Artists will scarcely need such an argument to convince them that the exterior of a musical instrument ought to be made beautiful; and when we mention the fact that there are organ-cases in existence which are adorned with decorative paintings from the hands of Paolo Veronese, Carlo Urbino, the Holbeins,

Burgkmeyer, and Zeitbloom, we have said enough to show that no artist ought to consider it beneath his dignity to paint the outside of an organ. — *The Builder.*

THE HIGH BUILDING PERIL.

IN a recent issue we made some comments on the fact that the number of immensely tall buildings was rapidly increasing in the large cities. After saying that the "commercial necessities of the country demand large and high buildings," the article continued as follows: —

Science must be called upon to provide the required fire protection, and this will come mainly through a better class of buildings made more nearly fire-proof than existing buildings are. It will not be long before business blocks ten, twelve and even fifteen stories high will be the rule in large cities rather than the exception, and those who now think it would be wise to restrict their height will find it more profitable to turn their attention to devising methods for making such structures safe. The introduction of elevators has made the upper floors more desirable for office purposes than the lower ones, and tenants will occupy them with little regard to the hazard they run in so doing. Our fire authorities are doing all in their power to increase the capacity of fire-extinguishing apparatus, but there is a limit beyond which even steam-engines cannot pass. To make these tall buildings comparatively safe, the law should compel them to carry their own fire protection as permanent fixtures.

The *Investigator* takes us to task for thus recognizing the inevitable and says: "If the construction of blocks of buildings 'ten, twelve and even fifteen stories high is to be the rule in large cities' and to receive encouragement from firemen's and insurance journals, then insurance companies may as well prepare at once either to withdraw from these cities or double the rates of premium." If our critic will read again what we wrote, he will see that we took the same view of the question, for we distinctly said that what remained for the insurance companies to do was to "charge for the risk as they find it." If the height of a building warrants the doubling of the rate, then the rate should be doubled. Our contemporary approves the position taken recently by the Chicago underwriters, who petitioned the City Council to restrict the height of all buildings to eighty-five feet. This is simply "kicking against the pricks," for such a restriction would be opposed to public sentiment and to public interests. Some of our underwriters can remember when they protested against four and five story buildings in this city, and endeavored to prevent their erection by charging an extra rate for height, but their efforts to arrest the demands of commerce were as ineffectual as was the Pope's Bull against the comet. Instead of four and five story structures, seven, eight and nine stories are the rule, while there are many buildings in this city that are from ten to twelve stories high. With increased height of buildings there has come an extension of their areas, so that a space that would have formerly sufficed for half a dozen buildings is all under one roof. Herein lies a greater danger than from extraordinary height, for if a fire gets well started in such a building, it makes a mass of flame and heat that is unapproachable and can only be fought at long range. A noted dry-goods store on Broadway is a fair illustration of this. A few weeks since Chief Bates and some underwriters and merchants were looking over the risks in the dry-goods district, and the Chief was asked what would be the result of a fire in this building. His laconic answer was: "A conflagration." The building covers nearly a block of ground, and there is not a fire-wall in it — it is one immense store, filled with combustible materials. Should a fire take in one part it would spread rapidly through the entire space, and the heat would be so intense that the firemen could not approach it. They would have a terrible fight on their hands and where the "conflagration" would be stopped no one could predict. If three or four fire-walls divided this immense area, the firemen would be able to utilize one part to combat a fire raging in another. As ocean-going ships are now divided into compartments so that one of them may be filled with water and the vessel still float, so should our large buildings be divided into compartments by fire-walls, so that a fire may rage in one without destroying the others. But where immense undivided areas are combined with extraordinary height the hazard is greatly increased, and such a building becomes a standing menace to the safety of that portion of the city surrounding it.

Recognizing the fact, however, that commercial necessities demand large and tall buildings, we have urged underwriters to require them to be built with some regard to safety. Such buildings must be insured, and if the underwriters act in concert, they can compel owners to adopt such measures to secure safety as will reduce the hazard to the minimum. It is claimed for the famous Welles Building, in Exchange Place, which is ten stories high, that it is fireproof, and such confidence has the owner in its fire-resisting qualities that it is insured to a very small amount. This building cost $2,500,000, and there must be great confidence where such an amount is left at risk almost without insurance. While the interior has some woodfinish about it, there is not enough, it is claimed, to injure the walls, if it should all burn. It certainly has the appearance, inside and outside, of being remarkably well built, and possessing but a slight fire hazard. If all our tall buildings were as well built, their extra height would not add much to the city's peril. Our contemporary ridicules the idea that permanent attachments to such buildings for fire protection afford any security, for the reason that there is not sufficient water pressure in any city to force water to their roofs. Let us ask what large city relies upon its water pressure for fire extinguishment? According to our information, they all have steam fire-engines that throw the streams, and the firemen have a habit of uniting the power of several engines to throw one stream when heavy pressures are required. If the Welles Building, whose brick-paved roof is one hundred and forty-five feet above the curb, is equipped with the latest improved stand-pipes, to which the engines can be connected, there will be little difficulty in getting a stream of water up there through the medium of steam fire-engines. From this point the firemen could obtain command of fires burning the adjacent buildings below them, in addition to protecting the building itself. Automatic sprinklers have been found of exceeding value in the large mills of New England, and they might well be introduced into the high buildings of our cities. By placing a reservoir on the roof to supply them with water, making all floors water-tight so as to avoid excessive water damage, and connecting the sprinklers with an automatic fire-alarm, they would certainly prove valuable appliances for extinguishing fires. But if tall buildings are to be erected — and we conceive that they will be — it is essential to their safety and the safety of their surroundings, that they be amply provided with fire-extinguishing appliances as permanent fixtures, only such being recognized by the underwriters as have the approval of the officers of the fire department. Recently the Board of Underwriters voted to allow a rebate of five per cent on all buildings equipped with the Benner stand-pipe and ladder combined. This is an appliance that meets the approval of the fire-department officials, while the stand-pipes ordinarily erected are scorned and derided as useless encumbrances, that the firemen never attempt to use. It is common for owners of buildings to be content with anything in the nature of fire-extinguishing appliances that will satisfy the underwriters and keep their rate down. They should instead be required to satisfy the practical officers of the fire-department, and when these have certified to the value of an appliance for fire extinguishment it will be time for the underwriters to make reductions of rates in consequence of their adoption. As the firemen are the ones to use all extinguishing apparatus, they are the ones to pass judgment upon them.

We are well aware that it is impossible to erect an absolutely fireproof building, but buildings can be so constructed as to offer a great amount of resistance to the progress of a fire, and can be so equipped with fire-extinguishing appliances that the fire hazard in a high building will be less than it now is in the average business buildings of our large cities. We are not in favor of high buildings, but we may as well accept the inevitable and prepare for it. The limit of aerial construction has not yet been reached, and it is well to consider how these tall buildings of the future are to be made as little perilous as possible. As they rise above the capacity of the machinery of the fire departments to reach, it follows that they must carry their own fire-extinguishing appliances. As we remarked before, "science must be called upon to provide the required fire protection, and this will come mainly through a better class of buildings, made more nearly fire-proof than existing buildings are." Underwriters can exercise a potent influence in securing better construction if they will in every instance enforce their own motto, and "charge for the risk as they find it." Property-owners would soon find that there is a profit in slow-burning construction, and in so equipping their buildings with fire-extinguishing appliances as to reduce the fire hazard to the minimum. — *The Fireman's Journal.*

AN OPENING FOR SKILLED LABOR.

MARTINSVILLE, HENRY CO., VA.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — This is a growing, pushing village of a thousand people. It is the county seat of one of the wealthiest counties in Virginia. There are building enterprises of various sorts in progress, and altogether it is one of the finest openings for skilled labor within my knowledge. This county has a population of 17,000, and is small in area. Out of this number of people there is but one really first-class brick-mason; but one plasterer, who is master of his trade; not one blacksmith who could earn a living at his trade, in competition with what would be known as a skilled blacksmith in the North.

This absence of labor of this kind may be accounted for by the fact that until two years ago the county seat was *forty miles* from a railroad station, but within that time a narrow-gauge road has been built through the county, and the people are awakening to their needs and opportunities. At this place, within six months, quite a number of brick and wooden buildings have been erected, and $75,000 will have been invested that way this year; all this for a village, which, according to the census, had 290 people in June, 1880.

Whilst enterprises of various sorts are on foot, and many to be pushed forward during the season, there is not a *draughtsman* in this county, or its only village. It is not my purpose to worry the patience of the readers of the *American Architect*, but to do what I can toward attracting to the South, and particularly to this Virginia county, some of the surplus skilled labor of the populous North. L. S. T.

VENTILATING FIREPLACES.

Richmond, Va., May 7, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Please inform me whether there are any parties in this country who are manufacturing Captain D. Galton's Patent Ventilating Fireplaces, or similar ones answering the same purpose.

Yours respectfully, Albert Lybrock.

[We do not know that the Galton fireplace is manufactured in this country. Fireplaces based on similar principles are made by E. A. Jackson & Brother, 77 Beekman Street, New York; the Open Stove Ventilating Co., 78 Beekman Street, New York; and the Dimmock Heater Co., Cincinnati, O. For full information on the subject, we refer our correspondent to Mr. Putnam's book, *The Open Fireplace in All Ages,* published by James R. Osgood & Co., Boston, Mass.— Eds. American Architect.]

LIME-KILNS.

New York, May 14, 1883.

To the Editors of the American Architect: —

Dear Sirs,—We would refer your lime-kiln correspondent (*American Architect,* p. 227,) to the article "Lime," in Appleton's *Dictionary of Machines, Mechanics, Engine-Work and Engineering,* where dimensions and product are given. Would suggest an examination of the Index to *Scientific American Supplements,* and special examination as to the rock to be used, as to dimensions of local kilns, etc.

X. G. X.

Syracuse, May 14, 1883.

To the Editors of the American Architect: —

Dear Sirs, — To "Subscriber" who asks for a book on lime-kilns, I would recommend "*Mahan's Civil Engineering,*" published by Wiley & Sons, New York. This book contains many suggestions of value in regard to lime and its manufacture, and gives cuts and descriptions of different varieties of kilns.

Yours truly, E. M. Buell.

NOTES AND CLIPPINGS.

Large Anvil-Blocks for Steel Works.— Owing to the rapid and very extensive growth of the manufacture of Siemens steel in Scotland, there has been a somewhat extraordinary demand for large anvil-blocks north of the Tweed within the past few years, and during the past week two, of immense size, have been cast. Up till now there has not been any anvil-block in Scotland weighing more than 140 tons, but on Saturday of last week one was cast at the Dalziel Steel Works, Motherwell (Messrs. Colvill's), which is said to contain 170 tons of metal, and there is in progress at the steel works of the Govan Forge and Steel Company, Glasgow, an anvil-block which is estimated eventually to contain about 165 tons of metal. In both cases these anvil-blocks are intended for use with 12-ton steam-hammers, of which there are already several in regular work in Scotland. The Govan anvil-block will be in two pieces, the larger of which, weighing about 140 tons, was cast last Saturday, in the presence of a large number of representatives of the engineering and allied branches of industry. It was cast in a mould occupying the position which the block will eventually occupy after it has been slowly cooled, and has been canted over upon its proper base. The other portion, which will form the top piece or swage block, and will weigh about 25 tons, will be cast within the next few days. The mixture used in the anvil-blocks under consideration was about one-fourth No. 3 Gartsherrie pig-iron and three-fourths scrap cast-iron, two of Ireland's patent cupola furnaces, each capable of melting six tons of metal per hour, being used, in the operation and the blast being obtained from a No. 7 Root's blower. The manufacture of this anvil-block is entrusted to Mr. William Ireland, of Manchester, who, during the last fifteen or twenty years, has had a most extensive and peculiar experience in connection with the casting of such blocks, both in this country and in Germany; indeed, in the last-named country he has superintended the construction of somewhere about thirty, of which no fewer than thirteen, of a total of 2000 tons, were made for the Union Company, of Dortmund, five of them being blocks of 175 tons each. For the Osnabrück Steel and Iron Company Mr. Ireland made three blocks, one of which weighed 250 tons, which, like the Govan and Motherwell blocks, was intended for use with a 12-ton hammer.—*Engineering.*

Condition of the "Monuments" of Cairo.— Mr. Stanley Lane Poole writes from Cairo to the *Athenæum* about the commission appointed to preserve the monuments of the city. He found the committee scrupulously alive to the smallest indication of artistic or historical value in the most inconsiderable monuments. Of seven monuments examined on the 24th of February only one was condemned, a small mosque, whose walls had nearly fallen, and whose interior was a heap of ruins. It was decided to search the ruins for any pieces of ornament or mosaic, and place them in the museum, recording in the archives the site and name of the mosque. One monument had beautiful stucco tracery fast falling to pieces; it was decided to have it photographed at once. One danger to monuments in Cairo is the commission called *Tanzûn,* which widens and straightens the streets. Beautiful private houses and mosques have fallen victims to this Europeanization of Cairo. It appears that room is wanted for carriages, and thus the most picturesque quarters of the city are losing their beauty. A museum of Arab art is to be founded in the Mosque El-Hakûn, and already contains eighty-four glass mosque lamps, fifty of which have inscriptions, blazons, and enamel, and belong to the Mameluke period, besides many other things, such as bronze doors, panel-work, inlaid silver tables and nuhrâbs, or niches, covered with arabesques and inscriptions.

The Mill-Chimney Accident at Bradford, England. — The inquiry at Bradford concerning the fall of the chimney of the Newlands Mills was concluded on Wednesday. After a consultation of two hours the following verdict was returned by the coroner's jury: — "We find that the owners of the property at Newland Mills did all that unpractical men could reasonably be expected to do under the circumstances; therefore we do not attach any blame to them, or find them guilty of negligence; and we give our verdict — 'Accidental death.' We are of opinion that the foundation was good and the fall of the chimney was partly due to cutting, aided by the strong wind on the morning of the accident, and regret the works were not stopped during the repairs." No other verdict, we suppose, was possible. In manufacturing towns there is much faith in the genius of chimney straighteners, and the jury were likely to possess that faith. It was plain from the evidence that the late owner of the mill did not consider himself to be an unpractical man; on the contrary, he was esteemed by the people in his service as an authority on construction. He overruled the opinions of builders and architects, and the consequences of his despotic interference are now apparent. It was with difficulty that his representatives could be persuaded that there was any risk attending a work which he directed. The catastrophe is a terrible example of the danger which may arise when a man is his own architect. — *The Architect.*

The Cost of Public Buildings. — A statement prepared at the Treasury Department shows the amounts appropriated and expended by the national Government for public buildings in the States and Territories from March 4, 1789, to June 30, 1882. The total amount appropriated has been $88,462,262, and the amount expended has been $83,404,221, distributed as follows:

New York	$11,314,656.88	Georgia	$498,648.21
Massachusetts	7,670,023.96	North Carolina	454,005.63
Pennsylvania	7,482,469.42	West Virginia	384,903.60
Illinois	7,463,936.98	Rhode Island	326,463.23
Missouri	6,134,068.63	Arkansas	306,745.79
Ohio	5,796,968.77	Texas	299,722.30
Louisiana	4,972,368.58	Vermont	252,276.38
South Carolina	3,386,883.90	Kansas	205,834.63
California	2,115,622.67	New Hampshire	173,670.96
Maine	2,080,137.40	Florida	156,220.95
Maryland	1,864,602.80	Mississippi	138,275.16
Tennessee	1,129,044.18	Delaware	102,924.97
Connecticut	1,074,925.43	New-Mexico Territory	97,824.86
Virginia	847,442.61	Utah Territory	64,998.90
Kentucky	793,029.61	Washington Territory	61,753.83
Michigan	781,673.41	Montana Territory	48,772.75
Indiana	779,057.66	Colorado	44,154.84
New Jersey	685,744.11	Idaho Territory	41,738.15
Nebraska	624,607.05	Wyoming Territory	40,109.22
Wisconsin	601,723.74	Alaska Territory	5,989.31
Oregon	565,983.39	Dakota Territory	533.45
Minnesota	531,602.72	Miscellaneous repairs, etc.	6,947,868.51
Alabama	527,896.03		
Iowa	526,316.07	Total	$83,404,221.54

This statement does not include the cost of the Mint buildings or the cost of any of the public buildings in the District of Columbia.

Iron Cements. — The *Technische Commerz Zeitung* gives the following recipes for cements for iron:—

Cement which resists Heat and Water. — Lime, 10 parts; iron filings, 5; vinegar, 2; water, 3.

Black Iron Cements for Iron Ovens. — Iron filings, 10 parts; sand, 12; bone-black, 10; slaked lime, 12; lime milk, 5.

Cement for objects which have to be heated. — Iron filings, 100 parts; clay, 50; common salt, 10; quartz sand, 20.

Cement for fastening Iron to Stone. — Fine iron filings, 10 parts; plaster of Paris, 30; sal-ammoniac, ½. These are mixed to a fluid paste with weak vinegar, and used at once.

Cement for Iron Cisterns. — Finest iron filings are mixed with vinegar into a paste, which is left to stand until it becomes brown; the mass is then pressed into the joints.

Fire-proof Cement for Iron Pipes. — Wrought-iron filings, 45 parts; clay, 20; china clay, 15; common salt solution, 8. If china-clay cannot be found, fire-clay will serve the purpose instead.

Ammonia Iron Cement. — Iron filings, 100 parts; sal-ammoniac, 2; water, 10. This cement begins to rust after some days, and becomes very strong, and is proof against water and steam.

Cement for Annealing-Boxes. — Iron filings, 100 parts; lime milk, 40; quartz sand, 50; vinegar, 20. These are worked with water into a paste, to which may be added, to render the mass more porous, hair, sawdust, etc.

Iron Cement for hermetically closing Stove-Doors. — Finest iron filings, 100 parts; sal-ammoniac, 10; limestone, 10; soluble glass solution, 10. These are mixed with water to a thick paste, which is applied at once, and is left to dry slowly before heating.

Cement for broken Iron Vessels. — Iron filings, 10 parts; clay 60. These are worked with linseed oil into a thick paste, which is applied after some more linseed oil has been added to it, and left to dry slowly.

Rust Cement for Iron. — Wrought-iron filings, 65 parts; sal-ammoniac, 2½; sulphur (flowers) 1½; sulphuric acid, 1. The solid ingredients are mixed dry, sulphuric acid diluted with sufficient water being then added. This cement dries after two or three days, and unites with iron, making a very resisting and solid mass.

Cement for filling Faults in Castings. — Iron filings, free from rust, 10 parts; sulphur, ½; sal-ammoniac, 0.8. These are mixed with water to a thick paste, which is rammed into the "faults." This becomes strong when the iron-filings are rusted. The parts which have to be cemented are treated before the operation with liquid ammonia, so as to be perfectly free from grease.

Fire-proof Cement. — (1) Iron-filings, 140 parts; hydraulic lime, 25; quartz sand, 25; sal-ammoniac, 3. These are formed into a paste with vinegar, and then applied. This cement is left to dry slowly before heating. (2) Iron filings, 180 parts; lime, 45; common salt, 8. These are worked into a paste with strong vinegar. The cement must be perfectly dry before being heated. By heating it becomes stone hard. — *Engineering News.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

SUMMARY OF THE WEEK.

Baltimore.

BANK-BUILDING. — Chas. L. Carson, architect, has prepared drawings for a five-st'y bank-building to be erected cor. Sharp and Lombard Sts., to be designated the People's Bank. It will be of brick, with stone and terra-cotta finish, 27′ 6″ x 130′; cost, $40,000; J. Holland, superintendent.

WAREHOUSES. — George Archer, architect, has prepared drawings for the Trustees of the Samuel Ready Asylum for Female Orphans, for 4 four-st'y warehouses on Camden St., near Howard St., brick, with stone finish, 21′ 6″ x 80′; cost, $30,000; Messrs. Hopkins & Marshall, builders.

BUILDING PERMITS. — Since our last report thirty-one permits have been granted, the more important of which are the following: —

Trustees of Samuel Ready Asylum for Female Orphans, 4 four-st'y brick warehouses, n s Camden St., between Howard and Sharp Sts.

W. H. Bynion, 2 three-st'y brick buildings, w s Chester St., s of Hampstead St.

R. E. Diffenderfer, 10 three-st'y brick buildings, e s Park Ave., n of Wilson St.

Mary C. Irvine, 7 three-st'y brick buildings, e s Mount St., between Lexington and Fayette Sts.; and 6 two-st'y brick buildings, w s Vincent Alley, between Baltimore and Fayette Sts.

Geo. H. Klark, 2 three-st'y brick buildings, w s High St., between Fayette and Low Sts.

Anne G. Hellwing, three-st'y brick building, s s Eastern Ave., w of Ann St.

Monroe-street M. E. Church, three-st'y brick parsonage, s w cor. Monroe and Ramsay Sts.

Michael Ryan, 2 three-st'y brick buildings, s s McMechin St., between Pennsylvania Ave. and Division St.

Frederick Blank, 2 three-st'y brick buildings, w s Dorsey Alley, between West and Clements Sts.

C. H. Callis, 6 two-st'y brick buildings, s s Hoffman St., between Ensor St. and Holbrook Alley.

Sheep Butcher's and Wool-Pulling Association No. 2, 7 two-st'y brick buildings, s s Robert St., between Division and Boulder Sts.; and three-st'y brick building, s w cor. Division and Robert Sts.

First United Brethren Church, 4 two-st'y brick buildings, s s Perry St., between Hanover and Sharp Sts.

St. Elizabeth Home, three-st'y brick building in rear of No. 57½, e s St. Paul St., between Saratoga and Pleasant Sts.

Jacob Saum, 12 three-st'y brick buildings, n s Hollins St., between Stricker and Gilmor Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Beverly St., Nos.* 93–99, Ward 7, for J. C. & E. S. Converse, stores, 40′ 10″ x 84′ 6″, five-st'y flat.

Medford St., Nos. 66–76, Ward 7, for Boston Rubber Shoe Co., warehouse, 84′ x 155′, five-st'y flat.

Commonwealth Ave., No. 180, Ward 11, for Wm. S. Rand, dwell., 26′ x 67′, three-st'y mansard; Wm. S. Rand, builder.

K St., No. 202, Ward 14, for Edward S. Winchester and Isaac Hayden, cover to boiler and engine, 10′ x 20′, one-st'y pitch.

South St., Nos. 128–136, Ward 12, for Frank M. and Albert G. Frost, mercantile, 60′ and 68′ x 77′, five-st'y flat; M. S. & G. N. Miller, builders.

Norfolk Pl., No. 6, Ward 12, for Samuel S. Campbell, mercantile, 31′ x 35′ 7″, six-st'y flat; E. Whitmore, builder.

Warren St., cor. Rockland St., Ward 21, for Geo. Hinman, dwell., 24′ x 50′; A. D. Gould, builder.

Warren St., cor. Rockland St., Ward 21, for Chas. F. Worthington, dwell., 24′ x 50′; A. D. Gould, builder.

Wood. — *Tremont St.*, near Whitney Pl., Ward 22, for Patrick Daley, dwell., 22′ 6″ x 49′ 6″, three-st'y flat; James Donnelly, builder.

Dove St., Nos. 24–28, Ward 14, for Thomas P. Frost, stable, 30′ x 60′, two st'y flat; Laming & Drisko, builders.

Blue Hill Ave., Nos. 40–44, Ward 20, for Leander B. Abbott, 3 dwells., 23′ x 51′, three-st'y flat; Leander B. Abbott, builder.

Sumner St., Nos. 387 *and* 389, Ward 2, for Eliza Moore, 2 dwells., 17′ x 25′ and 17′ x 30′, two-st'y pitch; Herman Drake, builder.

Gilbert St., near Hoffman St., Ward 23, for Miss Anna M. Hall, dwell., 22′ 6″ x 30′ 6″, and 16′ x 18′, two-st'y pitch; Robert D. Ward, builder.

Story Pl., off Greenough Ave., Ward 23, for Edward Sherwin, dwell., 32′ 4″ x 51′, two-st'y pitch; Wm. H. Stewart.

Roslin Ave., nearly opposite Albano St., Ward 23, for Emil Fryksland, dwell., 22′ and 28′ x 36′, two-st'y pitch; Alexander Rogers, builder.

Hyde Park Ave., e of Richards Ave., Ward 23, for A. K. Cortland, dwell., 21′ x 26′, two-st'y pitch; Melvin D. Ayers, builder.

West First St., No. 147, Ward 13, for Joseph W. Clark, et als., mechanical, 28′ x 30′, one-st'y flat; James Hopkins, builder.

Randlett Pl., near Rand St., Ward 20, for Albert Ward, dwell., 22′ and 25′ x 30′, and 15′ x 18′, two-st'y pitch; Decker Bros., builders.

East Seventh St., No. 538, Ward 14, for Phillips Church Society, church, Congregational, 30′ x 85′, two-st'y flat; Holbrook & Harlow, builders.

Pratt St., near Linden St., Ward 25, for John Keegen, Jr., dwell., 20′ x 30′, two-st'y pitch; Samuel Beal, builder.

Union Ave., Ward 23, for B. F. Sturtevant, storage, 20′ x 75′ and 10′ x 75′, two-st'y flat; Samuel Case, builder.

Bellevue Ave., near Dudley Ave., Ward 23, for Edward Callahan, owner and builder, dwell., 20′ x 28′, two-st'y pitch.

M St., cor. East Fourth St., Ward 14, for Mrs. Fannie E. Stetson, dwell., 21′ x 30′, two-st'y pitch; D. A. Berry, builder.

Dorchester Ave., No. 579, Ward 15, for Christopher Burr, mercantile, 26′ x 35′, two-st'y pitch; Isaac H. Dunn, builder.

Boutwell Ave., cor. Train St., Ward 24, for Laban Pratt, stable, 37′ 3″ x 48′ 8″, one-st'y pitch; Samuel Davenport, builder.

Greenville St., No. 27, Ward 21, for Wm. Barton, owner and builder, dwell., 39′ x 40′, two-st'y pitch.

Nelson St., rear Norfolk St., Ward 24, for John F. Brown, dwell., 16′ x 36′ and 13′ 6″ x 21′, two-st'y pitch; John F. Brown, builder.

Wood St., Nos. 12 *and* 14, Ward 5, for Francis B. Austin; 2 dwells., 23′ 6″ x 31′ and 13′ x 32′, three-st'y flat; Edward W. Archer, builder.

George St., No. 81, cor. *Magazine St., No.* 31, Ward 20, for M. Kaiser, dwell. and store, 34′ and 39′ x 43′, three-st'y flat; Geo. F. Penney, builder.

Brooklyn.

BUILDING PERMITS. — *Vernon Ave.*, n s, 125′ w Sumner Ave., 5 two-st'y brick dwells., tin roofs; cost, each, about $4,000; owner, Jno. Longhi, 697 Willoughby Ave.; builder, S. C. Phillips.

Union St., n s, 253′ w Seventh Ave., 2 four-st'y brownstone front tenements, gravel roofs; cost, each, $6,000; owner, G. W. Brown, 728 Fulton St.; builder, L. E. Brown.

Elm St., e s, 50′ n Myrtle Ave., three-st'y frame store and double tenement, tin roof; cost, $1,000; owner, Michael Hoag, Forrest St.; builders, W. Bayer and P. Scheu.

President St., s s, 282′ 2″ e Smith St., 4 three-st'y brownstone front dwells., gravel roofs; cost, total, $24,000; owner, Chester Bedell, 337 Smith St.; architect and carpenter, Theodore Pearson; mason, Walter Smith.

Thirteenth St., n s, 100′ e Fifth Ave., 5 two-st'y brick dwells., tin roofs; cost, each, $2,500; owner, Daniel Doody, 605 Fifth Ave.; architect, C. B. Sheldon.

Eighth Ave., n e cor, President St., 4 four-st'y brownstone front dwells., tin roofs; cost, each, $20,000; owner and builder, Wm. Gubbins, 20 Seventh Ave.; architect, C. Werner.

Jefferson St., s s, 150′ e Marcy Ave., 3 three-st'y brick dwells., tin roofs; cost, each, $7,500; owner and builder, Geo. H. Stone, 301 Jefferson St.; architect, G. A. Schellinger.

North Eleventh St., two-st'y brick storage-building, gravel roof; cost, $13,000; owner, Pratt M'f'g Co., foot of North Twelfth St.; architect, F. Le K. Sweet; builders, J. Rooney and Jenkins & Gillies.

Broadway, s w cor. Park Ave., three-st'y brick store and tenement, tin roof; cost, $12,000; owner, Otto Wagner, 178 Floyd St.; architect, T. Engelhardt; builders, G. Lehrian & Son.

Magnolia St., s e s, 33′ 11″ s w Myrtle Ave., three-st'y frame store and tenement, tin roof; cost, $5,000; owner, Mrs. Gillespie, 47 South Fourth St.; architects, Duckworth & Co.; builder, J. Fallon.

Furnam St., s e cor Middagh St., 3 four-st'y brick factory buildings, tin or gravel roofs; cost, about $8,000 each; owner, Cornelius Donnellon, Pacific St., near Henry St.; architect, G. P. Chappell.

Leonard St., No. 581, w s, 225′ n Nassau Ave., three-st'y frame tenement, gravel roof; cost, $3,500; owner, Jno. Affleck; architect, William Shapter; builder, not selected.

Dean St., s s, 200′ e Washington Ave., 2 three-st'y brick double tenements, tin roofs; cost, each, $5,000; owner, Thos. Monahan; architect, I. D. Reynolds; builder, T. Donnelly.

Reid Ave., w s, 24′ n Quincy St., 8 two-st'y and basement brownstone front dwells., gravel roofs; cost, each, $4,800; owner, H. Battermann, 111 Reid Ave.; architect, A. W. Dickie; builders, —— Burroughs and C. L. Johnson.

Reid Ave., n w cor. Quincy St., three-st'y and basement brownstone front dwell., gravel roof; cost, $7,000; owner, etc., same as last.

Fifth St., n s, 212′ e Fifth Ave., 4 two-st'y brownstone front dwells., composition roofing; cost, each, $5,000; owner and builder, P. Mullady, 576 Quincy St.; architects, Parfitt Bros.

Jefferson St., s s, 125′ e Central Ave., three-st'y frame double tenement, tin roof; cost, $4,000; owner, H. Asmus, Jefferson St., cor. Central Ave.; architect, T. Engelhardt; builders, E. Loerch and J. Rueger.

Central Ave., w s, 75′ n Jefferson St., three-st'y frame double tenement, tin roof; cost, $4,400; owner, Ferdinand Gessner, 175 Hopkins St.; builders, W. Reeath and H. Eich & Co.

Judge St., e s, 133′ n of Powers St., four-st'y frame double tenement, tin roof; cost, $5,800; owner, Gabriel Gengler, 276 Powers St.; architect, G. Hillenbraad; builders, W. Bayer and C. Welber.

Linden St., n s, 100′ w St. Nicholas Ave., one-st'y frame church; cost, $8,000; owner, Rev. Jno. McCloskey, St. Nicholas Ave. and Magnolia St.; architect, T. F. Houghton.

Rutledge St., n s, 222′ 6″ e of Marcy Ave., 2 two-st'y brownstone front dwells., tin roofs; cost, total $14,000; owner, John N. Sunderland, 39 Ross St.; architect, J. Rose.

Magnolia St., s e s, 50′ w of Myrtle Ave., three-st'y frame double tenement, tin roof; cost, $4,500; owner, Jacob Leich, Johnson Ave.; architect, G. Hillenbrand; builders, E. Loerch and J. Triesse.

Scholes St., e w cor. Ewen St., four-st'y frame tenement, tin roof; cost, $7,500; owner, Jacob Stadtmuller, Ewen St., near Meserole St.; architect, J. Platte; builders, J. Rauth and D. Kreuder.

Evergreen Ave., s w cor. Troutman St., three-st'y frame tenement, tin roof; cost, $4,500; owner and builder, Clemence Dehler, 139 Evergreen Ave.; architect, J. Platte.

Marcy Ave., e s, 20′ s Monroe St., 8 three-st'y brownstone front dwells., flat tin roof, with mansard on front; cost, about $6,000 each; owner, architect and builder, F. C. Vrooman, 444 Gates Ave.; mason, J. Softy.

Olive St., w s, 55′ n of Powers St., three-st'y frame double tenement, tin roof; cost, $4,400; owner, Friederich Spect, on premises; architect, G. Hillenbrand; builder, J. Rauth.

Bushwick Ave., e s, 51′ n of Maujer St., three-st'y frame double tenement, tin roof; cost, $4,000; owner, Mrs. M. Grammech, 145 Skillman Ave.; architect, J. Platte; builder, F. J. Berlenbach.

Johnson Ave., s w cor. Leonard St., four-sty brick tenement, tin roof; cost, $10,000; owner, Joseph Simon, Willoughby Ave., cor. Lewis Ave.; architect, J. Platte; builders, J. Rauth and D. Kreuder.

Baltic St., s s, 275′ e Smith St., 6 four-st'y brick double flats, gravel roofs; cost, each $10,000; owner and builder, Jas. W. Dearing, 434 Henry St.; architects, Parfitt Brothers.

Flushing Ave., s s, 25′ w of Hamburg Ave., 2 two-st'y frame double tenements, tin roofs; cost, each, $3,000; owner and builder, Geo. Loffler, 82 Thompkins Ave.: architect, T. Engelhardt.

ALTERATIONS. — *Manhattan Ave., No.* 437, two-st'y frame extension, tin roof, interior alterations; cost, $5,000; owner, Geo. Bullwinkle, Ash St., cor. Manhattan Ave.; architect, F. Webber; builders, M. Vogle and H. Eggers.

Broadway, e w cor. First St., three-st'y brick extension, tin roof, etc.; cost, $12,000; owners, First National Bank; builders, W. & T. Lamb and Jenkins & Gillies.

Bedford Ave., n e cor. Russ St., three-st'y brick extension; cost, $3,500; owner, Thos. S. Cooper, on premises; architect, E. T. Gaylor; builders, T. Gibbins and Jenkins & Gillies.

Chicago.

FLATS. — George Spohr has plans ready for 2 three-st'y and basement flats, 42′ x 60′, to be built on West Van Buren St., near Campbell Ave., for Charles Lee, to cost $15,000.

FACTORY. — Three-st'y factory, 75′ x 75′, is to be built for Gunglich & Brachvogel, on Kinzie St., near Ashland Ave.: Mr. George Spohr, architect.

BUILDING PERMITS. — J. Roeder, two-st'y brick flats, 21′ x 56′, 392 Webster St.; cost, $5,000.

Ole Johnson, three-st'y brick flats, 23′ x 72′, 81 West Huron St.; cost, $4,400.

W. B. Ogden's Estate, 4 two-st'y basement and attic brick dwells., 73′ x 06′, 380–380 Ontario St.; cost, $13,000.

Thos. Mahoney, two-st'y brick dwell., 22′ x 40′, 3807 Dearborn St.; cost, $3,000.

F. Hardt, two-st'y brick dwell., 25′ x 76′, 3830 State St.; cost, $5,700.

F. Mohan, two-st'y brick dwell., 22′ x 51′, 104 Polk St.; cost, $3,700.

Reynolds & Dale, three-st'y and basement brick store and dwell., 62′ x 74′, 2719–2723 State St.; cost, $24,000.

G. W. Stanford, 2 two-st'y basement brick dwells., 50′ x 50′, 416–418 Jackson St.; cost, $9,000.

N. Long, three-st'y brick store and flats, 65′ x 72′, 2628–2634 State St.; cost, $15,000.

Fred. Crumbaugh, three-st'y basement brick flats, 58′ x 150′, n e cor. College Place and Rhodes Ave.; cost, $75,000.

J. L. Hoesber, two-st'y basement brick dwell., 26′ x 55′, 900 Ashland Ave.; cost, $9,000.

A. Silhanek, three-st'y brick flats, 22′ x 60′, 436 South Jefferson St.; cost, $5,400.

S. Kirdera, three-st'y basement brick dwell., 22′ x 78′, 572 Centre Ave.; cost, $6,000.

C. B. Forrest, two-st'y basement brick stable, 36′ x 96′; cost, $5,000.

Wm. Shlotterback, two-st'y brick dwell. and store, 23′ x 62′, 455 Thirteenth St.; cost, $4,000.

Henry Tift, 6 four-st'y basement and attic brick stores and dwells., 74′ x 117, 407–417 North Clark St.; cost, $35,000.

H. W. Martin, 2 two-st'y basement brick dwells., 40′ x 40′, 137–139 Seventeenth St.; cost, $4,000.

M. J. Relph, two-st'y brick dwell., 22′ x 48′, 33 Congress St.; cost, $2,500.

H. H. Aldrich, two-st'y basement and attic brick dwell., 38′ x 60′, 194–196 Ashland Ave.; cost, $12,000.

M. Doorak, three-st'y basement brick dwell., 22′ x 68′, 136 Taylor St.; cost, $8,000.

Frank Conrad, two-st'y basement and attic brick dwell., 20′ x 61′, 539 West Eighteenth St.; cost, $5,200.

C. J. Singer, two-st'y brick barn, 64′ x 73′, 116–124 Lincoln Ave.; cost, $6,000.

Elizabeth Planer, two-st'y basement and attic brick dwell., 28′ x 60′, 596 Lasalle Ave.; cost, $9,000.

M. C. Langlois, 2 two-st'y brick flats, 48′ x 56′, Flourney St.; cost, $7,000.

P. H. Rice, three-st'y basement brick flats, 44′ x 65′, 46–48 Carpenter St.; cost, $15,000.

Cincinnati.

BUILDING PERMITS. — George Schutter, three-st'y brick building, cor. Fourteenth and Race Sts.; cost, $3,000.

James Mack, two-st'y frame dwell., No. 588 Eastern Ave.; cost, $7,000.

J. H. Weston, five-st'y brick store, No. 27 West Sixth St.; cost, $14,000; A. C. Nash, architect.

J. C. Thoms, two-st'y brick theatre, Central Ave., near Fifth St.; cost, $15,000; Henry Bevis, architect.

Zion Congregation, two-st'y brick building, Breman St.; cost, $3,800.

John Kahley, 2 three-st'y brick buildings, Central Ave., near Clark St.; cost, $12,000.

Henry Hussman, two-st'y brick building, No. 742 Front St.; cost, $3,300.

Mrs. Sara Gibner, three-st'y brick building, No. 198 Plum St.; cost, $3,000.

Mrs. Jane Coates, two-st'y frame dwell., Denman St.

Blocker, Sachs & Gretels, five-st'y brick factory, cor. Seventh and Sycamore Sts.; cost, $12,000.

B. H. Hathaway, two-st'y frame dwell., Park Ave., near Warsaw Pike; cost, $2,000.

Mrs. S. Gibner, addition to three-st'y brick building, 198 Plum St.; cost, $2,500.

Aug. Groeser, two-st'y brick dwell., cor. of Moleton and Vaughn Sts.; cost, $8,000.

F. Kirsch, two-st'y brick dwell., Kimball Ave.; cost, $2,500.

M. Arnold, two-st'y brick dwell., Crown St., near May St.; cost, $7,000.

Twelve permits for repairs; cost, $7,000.

Total permits to date, 346.

Total cost to date, $1,267,000.

Cleveland.

BUSINESS in the building line never looked brighter than at present, and the average for this year will greatly exceed that of last. Innumerable small houses are being built, as well as a great many fine dwellings.

HOUSES. — Double dwell. for H. C. Wick; cost, $15,500; W. Harris, contractor; C. O. Arey, architect.

Dwell. for H. J. Haywood; cost, $5,000; I. N. Harrison, contractor; C. O. Arey, architect.

Frame dwell. on Sibley St., for Mr. G. L. Schryrer; cost, $7,000; J. W. Flora, builder; F. O. Bate, architect.

STORES. — Business block on Ontario St., for E. M. McGillin; cost, $20,000; Walter Blythe, architect.

Business Block on Seneca St.: cost, $75,000; Co-operative Building Co., contractors; Coburn & Barnum, architects.

Business block on Bank St., for Morgan, Root & Co.; cost, $85,000; Cudell & Richardson, architects.

Business block on Bank St., for Bradford & Carter; cost, $35,000; S. Linas, contractor; C. O. Arey, architect.

CHURCH. — Congregational Church on Franklin St.; cost, $40,000; Co-operative Building Co., contractors; Coburn & Barnum, architects.

WAREHOUSE. — Warehouse on Huron St., brick; cost, $23,000; for Mr. Foster ——; Scott & Simmons, contractors; C. O. Arey, architect.

Detroit.

BUILDING PERMITS. — H. L. Beanbine, frame house, 409 Fourteenth St.; cost, $4,000.

Mason & Rice, brick house, 20 Peterboro St.; cost, $12,000.

H. George & Son, frame house, 159 Willis Ave.; cost, $4,000.

J. & H. Wagner, 2 brick houses, 32 and 34 Joy St.; cost, $8,000.

W. H. Holland, 5 brick houses, Sproat St.; cost, $19,000.

Alex. Chapoton, 4 brick stores, 384 to 390 Gratiot Ave.; cost, $5,700.

Mason & Rice, brick factory, First St.; cost, $7,000.

Macon & Rice, brick dwell., 1008 Woodward Ave.; cost, $12,000.

W. H. & C. F. Gibson, 2 frame houses, 838 and 860 Cass Ave.; cost, $6,000.

Robert Robertson, brick house, 8 Howard St.; cost, $5,000.

Albert Albrecht, brick store-house, 56 Croghan St.; cost, $12,000.

Nuppenan & Clark, brick warehouse, Atwater St.; cost, $5,000.

Donaldson & Meier, brick store and dwell., 421 Clinton St.; cost, $8,600.

Joseph Schrager, brick store and dwell., 501 Gratiot St.; cost, $3,000.

N. J. Rogers, frame dwell., 363 St. Aubine Ave.; cost, $4,000.

W. G. Vinton & Co., brick house, 34 Peterboro St.; cost, $9,000.

A. Chapoton, brick house, Peterboro St.; cost, $10,000.

A. C. Varney, brick warehouse, 96-100, West Congress St.; cost, $23,000.

A. C. Varney, four-st'y brick wire-works, 214 West Congress St.; cost, $14,000.

A. C. Varney, brick house and barn, East Montcalm St.; cost, $8,000.

A. C. Varney, brick house, 17 Peterboro St.; cost, $6,000.

A. C. Varney, double brick house, Cass Ave.; cost, $10,000.

A. C. Varney, 2 brick houses, 21 and 23 Bagg St.; cost, $17,000.

A. C. Varney, frame house, Cass Ave.; cost, $5,000.

A. C. Varney, brick house, 505 Cass Ave.; cost, $7,000.

J. A. De Gaw, 2 brick stores, Michigan Ave.; cost, $6,000.

Julius Hess, brick house, 555 Second St.; cost, $6,800.

Julius Hess, brick house, 557 Second St.; cost, $12,000.

Julius Hess, add. to brewery, Grand River Ave.; cost, $6,000.

Julius Hess, add. to church, Campan Ave.; cost, $4,900.

H. W. Holcomb, frame dwell., Fourth Ave.; cost, $4,000.

G. W. Vinton & Co., brick house, 96 Joy St.; cost, $5,000.

New York.

BUILDING PERMITS. — *Beach St., Nos. 74 and 76*, five-st'y brick flat, tin roof; cost, $24,000; owner, Wm. Rhinelander, 79 Cedar St.; builders, Freeman Bloodgood and J. C. Doremus.

Thirty-fourth St., n s, and East River, one-st'y brick shed, gravel roof; cost, $4,000; owner, East River Ferry Co., on premises.

Sixty-second St., s s, 150′ e Second Ave., 2 five-st'y brownstone front tenements, tin roofs; cost, each $14,000; owner, Morris Steinhardt, 648 Madison Ave.; architect, A. B. Ogden.

Avenue A, s w cor. Eighty-second St., five-st'y brick flat, tin roof; cost, $26,000; owner, Susan A. Wright, 201 West One Hundred and Thirty-first St.; architects, Cleverdon & Putzel.

Forty-second St., n s, 218′ e First Ave., two-st'y brick dwell. and office, tin roof; cost, $3,000; owners, Wilson & Adams, Thirty-ninth St., n e cor. First Ave.; architects and builders, Chas. Graham & Son.

Sixtieth St., n s, 325′ e Eleventh Ave., 2 four-st'y brick tenements and stores, tin roofs; cost, each $9,000; owner, Mary J. Largan, 410 West Forty-ninth St.; architect, G. W. Prodgers; masons, J. Mallon & Sons.

Fulton St., Nos. 82, 84, 86 and 88, 3 five-st'y brick stores; cost, $20,000, $25,000, and $55,000; owners, trustees of C. L. Wolfe, No. 3 Mercer St.; architect, Jno. B. Snook.

Pleasant Ave., n w cor. One Hundred and Nineteenth St., five-st'y brownstone front flat, tin roof; cost, $18,000; owners, John Dawson, 202 West Twenty-sixth St., and Wm. Archer, 246 East Twenty-first St.; architects, Thom & Wilson.

One Hundred and Nineteenth St., n s, 75′ w Pleasant Ave., five-st'y brick flat, tin roof; cost, $25,000; owners and architects, same as last.

Roosevelt St., No. 13, five-st'y brick tenement and store, tin roof; cost, $18,000; owner, Col. Conkling, 27 East Tenth St.; architect, Bernard McGurk; builders, John Fitzpatrick and Wm. Cooper.

Sixth Ave., No. 807, four-st'y brick factory, tin roof; cost, $11,000; owner, Angelo Ghiglione, 195 Lewis St.; architect, Wm. J. Fryer.

Sixth Ave., s w cor. One Hundred and Twenty-second St., 5 four-st'y brownstone front dwells., tin roofs; cost, each, $18,000; owner, A. B. Vandusen, 26 Mt. Morris Ave.

One Hundred and Twenty-second St., s s, 80′ w Sixth Ave., three-st'y brownstone front dwell., tin roof; cost, $18,000; owner, same as last.

East Fifteenth St., Nos. 402 and 404, 2 five-st'y brick tenements and stores, tin roofs; cost, each, $7,500; owner, Peter Butterly, 252 First Ave.; architect, M. W. Salmon.

Ninth Ave., e s, Manhattan to One Hundred and Twenty-fifth Sts., seven-st'y brick flat, tin roof; cost, $75,000; owner, Jared W. Bell, 57 Broadway; architects, Thayer & Robinson.

St. Nicholas Ave., w s, 75′ n One Hundred and Forty-seventh St., three-st'y frame dwell. and store, gravel roof; cost, $3,000; owner, Nathan Hobart, 39 West Twenty-sixth St.; architect, T. W. Clark.

Fourth Ave., s w cor. One Hundred and Twelfth St., 4 five-st'y brick flats, tin roofs; cost, each, $20,000; owners, J. & J. O'Sullivan, 649 East Sixty-ninth St.; architect, R. Rosenstock.

Nassau St., No. 111, six-st'y brick store, tin roof; cost, $75,000; owner, Geo. G. Sickels, New Rochelle; architect, E. Sniffeu; builders, Van Dolson & Arnott.

Broadway, Nos. 71 and 73, eight-st'y brick office-building, tin and slate roof; cost, $175,000; owner, Williamsburgh City Fire Insurance Co., 208 Broadway; architect, F. Carlos Merry; builders, Lewis H. Williams and Cheney & Hewlett.

East Fifth St., No. 742, three-st'y brick engine-house, tin roof; cost, $17,000; owner, City of New York; architects, N. Le Brun & Son.

Henry St., No. 269, three-st'y brick engine-house, tin roof; cost, $18,200; owner and architects, same as last.

Gold St., Nos. 92 and 94, and Jacob St., Nos. 11, 13, 15 and 17, six-st'y brick store, tin roof; cost, $75,000; owner, Ambrose K. Ely, 132 East Twenty-third St.; architect, John McIntyre; carpenter, Wm. J. O'Conner.

Greene St., Nos. 108, 110 and 112, 2 six-st'y brick and iron front stores, tin roofs; cost, each, $52,500; owners, Louisa B. Stillwell, extrx., 462 West Twenty-third St., and Levi Goldenburg, 29 East Sixty-seventh St.; builders, Van Dolson & Arnott.

Thirty-fifth St., n s, on bulkhead, North River, one-st'y freight-shed, tin roof; cost, $4,500; lessee, Pennsylvania Railroad Co.

Railroad Ave., e s, 300′ s One Hundred and Seventy-fifth St., 2 two-st'y frame dwells., shingle roofs; cost, each, $2,500; owner, Sarah J. Wyckoff, 1773 Washington Ave.; architect, Theodore E. Thomson.

West Thirty-sixth St., No. 140, five-st'y brownstone front flat, tin roof; cost, $22,000; owner, Samuel McMillan, 260 West Forty-sixth St.; architect, Jas. Ware.

Seventy-third St., n s, 135′ e Third Ave., 14 five-st'y brownstone front tenements, tin roofs; cost, each, $15,000; owner, Abraham H. Jonas, 13 Sheridan St.; architect, John C. Burne.

Eighty-second St., s s, 156′ 6″ e First Ave., five-st'y brick tenement, tin roof; cost, $17,000; owner, Annie E. Kelly, 404 East Eighty-second St.; architect, G. A. Schillinger.

One Hundred and Fifty-first St., s s, 200′ w Morris Ave., three-st'y frame dwell., tin roof; cost, $3,000; owner, Michael Sullivan, 472 East One Hundred and Fifty-first St.; architect, John Rogers.

One Hundred and Fifty-second St., n s, 255′ 8″ w Third Ave., three-st'y frame dwell., tin roof; cost, $6,000; owner, Jas. H. Riley, One Hundred and Fifty-first St. and St. Ann's Ave.; architect, M. J. Garvin; builders, P. Garvin & Son.

Second Ave., s w cor. One Hundred and Third St., 2 four-st'y brick flats and store, tin roof; cost, each, $20,000; owner, architect and builder, John Baird, 303 East One Hundred and Ninth St.

Seventieth St., n s, 100′ w Second Ave., 5 five-st'y brownstone front tenements, tin roofs; cost, each, $16,000; owner, John C. Umberfield, 216 East Sixty-first St.; architect, A. B. Ogden.

West Forty-fourth St., No. 28, one and part three st'y brick stable, tin roof; cost, $15,000; owner, A. V. H. Stuyvesant, Fifth Ave., cor. Forty-fourth St.; architect, Henry R. Marshall.

One Hundred and Forty-sixth St., s s, 200′ e Tenth Ave., 5 three-st'y frame dwells., gravel roofs; cost, each, $2,350; owner, Alex. Frazer, 22 West Thirty-sixth St.; architect, W. H. Berrian.

Greenwich St., Nos. 228 and 230, four-st'y brick store, tin roof; cost, $15,717; owner, Mary C. King; Great Neck; architect, Geo. M. Huss; builders, G. M. Platt and H. M. Smith & Son.

Broadway, n w cor. Thirty-fifth St., one-st'y brick theatre, peak fire-proof roof; cost, ——; owner, Chas. Johnson, 50 West Twenty-first St.; lessees, Richard Hyde, 431 Gold St., Brooklyn, and Louise C. Behrman, 17 St. Felix St., Brooklyn; architect, John Sexton.

West One Hundred and Thirtieth St., Nos. 34 to 56, 12 three-st'y brick dwells., tin roofs; cost, each, $11,000; owner, Wm. Astor, 23 West Twenty-sixth St.; builders, Jas. Webb & Son and John Downey.

East One Hundred and Seventeenth St., No. 322, three-st'y brick stable and workshop, tin roof; cost, $1,800; owner, Ella J. Carey, on premises; architect A. Spence.

One Hundred and Forty-second St., s s, 61′ e Ryder Ave., four-st'y frame tenement, gravel roof; cost, $6,000; owner, Mary Wilson, 183 West Eleventh St.; architect and builder, Geo. T. Campbell.

Decatur Ave., n e, s e and n w cor. Suburban Ave., 4 two-st'y frame dwells., shingle roofs; cost, each, $3,000; owner, Chas. Hedden, 15 Courtland St.; builder, Jos. Richardson.

Manhattan St., n s, 98′ e Tenth Ave., 2 four-st'y brick tenements and stores, tin roofs; cost, each, $15,000; owner, Peter McCormick, 164 East One Hundred and Twenty-eighth St.; architect, J. H. Valentine.

ALTERATIONS. — The building on the s w cor. of Canal and Eldridge Sts., is to be raised one st'y and first floor altered into retail stores, at a cost of about $15,000, for Mr. S. T. Babcock, from designs of Mr. Richard Berger; and from designs of the same architect, the building No. 112 Leonard St., is to be altered for office purposes, for Mr. George P. Slade, at a cost of about $4,000.

East Sixty-Sixth St., No. 59, three-st'y and basement brick extension; cost, $5,000; owner, Wm. Hoyt, on premises; architect, Wm. B. Tribby; builders, W. & T. Lamb, Jr.

West Third St., Nos. 3, 5, 7 and 9, four buildings to be connected, raise attic to full st'y, new flat roofs, and three-st'y and basement brick extension; also, new store fronts; cost, $20,000; owner, Ed. P. Dickie, 26 East Fifty-eighth St.; architect and carpenter, Chas. E. Haddon; masons, Kelly & Murdock.

Elm St., Nos. 66, 68, 70 and 72, three-st'y brick extension, portions of walls taken down and rebuilt, and internal alterations; cost, $10,000; owner, City of New York; architect, D. J. Stagg.

Eighth Ave., No. 466, two-st'y brick extension and internal alterations; also, front altered; owner, Lucy A. Ledwith, 315 West Thirty-third St.; architect, Jos. M. Dunn; builders, John W. Ross and John F. Moore.

West Thirty-sixth St., No. 49, raise one-st'y; cost, $3,500; owner, Dr. Robert Watts, on premises; architect, H. M. Congdon.

West Fifty-seventh St., No. 413, four-st'y brick extension; cost, $6,500; owner and builder, David Christie, on premises.

East Eighty-fourth St., No. 411, three-st'y and basement extension; cost, $3,000; owner, H. Zubiller, 190 Stanton St.; architect, Wm. Graul.

Philadelphia.

CHURCHES. — The following are churches in some stage of preparation or erection, from designs of Isaac Pursell, 1420 Chestnut St.:—

Heidelberg Reformed Church; two-st'y stone building, now being plastered; cost, when finished, $45,-000.

Gaston Presbyterian Church, two-st'y stone building; cost, when completed, $30,000; first story just finished.

A stone church and chapel to cost about $25,000, is now being erected for the Fiftieth Baptist Church.

Plans are in preparation for a two-st'y stone edifice for the First German Reformed Church; cost, $40,000.

Cohocksink M. E. Church will be erected this spring; stone, two-st'y, and cost, $30,000.

Plans of church and parish building in preparation for Episcopal Church of the Crucifixion.

Reformed Presbyterian Church, Nineteenth and Federal Sts., are having sketches made for a chapel to cost $10,000.

CONTRACT.—The contract for furnishing marble mantels for the Philadelphia Post-Office building has been awarded to Davidson & Son, of Chicago, Ill.

STRIKE. — The house painters have terminated their strike by compromising the matter, and agreeing to accept $2.75 per day until November 1st., when they will receive per hour, at above rate.

BUILDING PERMITS.— *Sixth St.*, e s, bet. Master and Thompson Sts., 6 three-st'y dwells., 14′ x 57′; Geo. Snyder, contractor.

North Sixth St., No. 3038, three-st'y dwell., 18′ x 56′; Wm. Schoenleber, contractor.

Bucknell St., e and w sides, bet. Montgomery Ave. and Berks St., 63 two-st'y and 4 three-st'y dwells., with stores, 14′ x 35′ and 16′ x 35′; H. R. Shoch, owner.

Cherry St., n s, e of Tenth St., three-st'y dwell., 16′ x 25′; P. J. Essex, contractor.

Barr St., n s, bet. Germantown Ave. and Nice St., 6 two-st'y dwells., 14′ x 28′; McLaughlin & McNamara, contractors.

Ellsworth St., n s, bet. Twenty-fourth and Twenty-fifth Sts., one-st'y storehouse, 37′ x 70′; W. Wharton, Jr. & Co., owners.

Haverford St., n s, w of Fifty-fourth St., 2 three-st'y dwells., 18′ x 50′; Daniel Deal, owner.

Martel St., cor. Terrace St., 5 two-st'y and 1 three-st'y dwells., 15′ x 28′; Thos. Cavanah, owner.

Twentieth St., e s, bet. Diamond St. and Susquehanna Ave., 17 three-st'y dwells., 17′ x 56′; E. H. Flood, owner.

Uber St., w s, bet. Diamond St. and Susquehanna Ave., 17 three-st'y dwells., 17′ x 56′; E. H. Flood, owner.

Susquehanna Ave., bet. Uber and Twentieth Sts., 8 three-st'y dwells., 19′ x 56′; E. H. Flood, owner.

Diamond St., n s, bet. Uber and Twentieth Sts. 8 three-st'y dwells., 19′ x 68′; E. H. Flood, owner.

Wellington St., e s, s of Kensington Ave., two-st'y dwell., 17′ x 30′; Alex. Pollock, owner.

North Nineteenth St., No. 1738, two stores and dwells., 12′ x 30′; C. A. Snyder, owner.

High St., s e s, e of Martin St., three-st'y dwell., 18′ x 50′; J. G. Shuler, contractor.

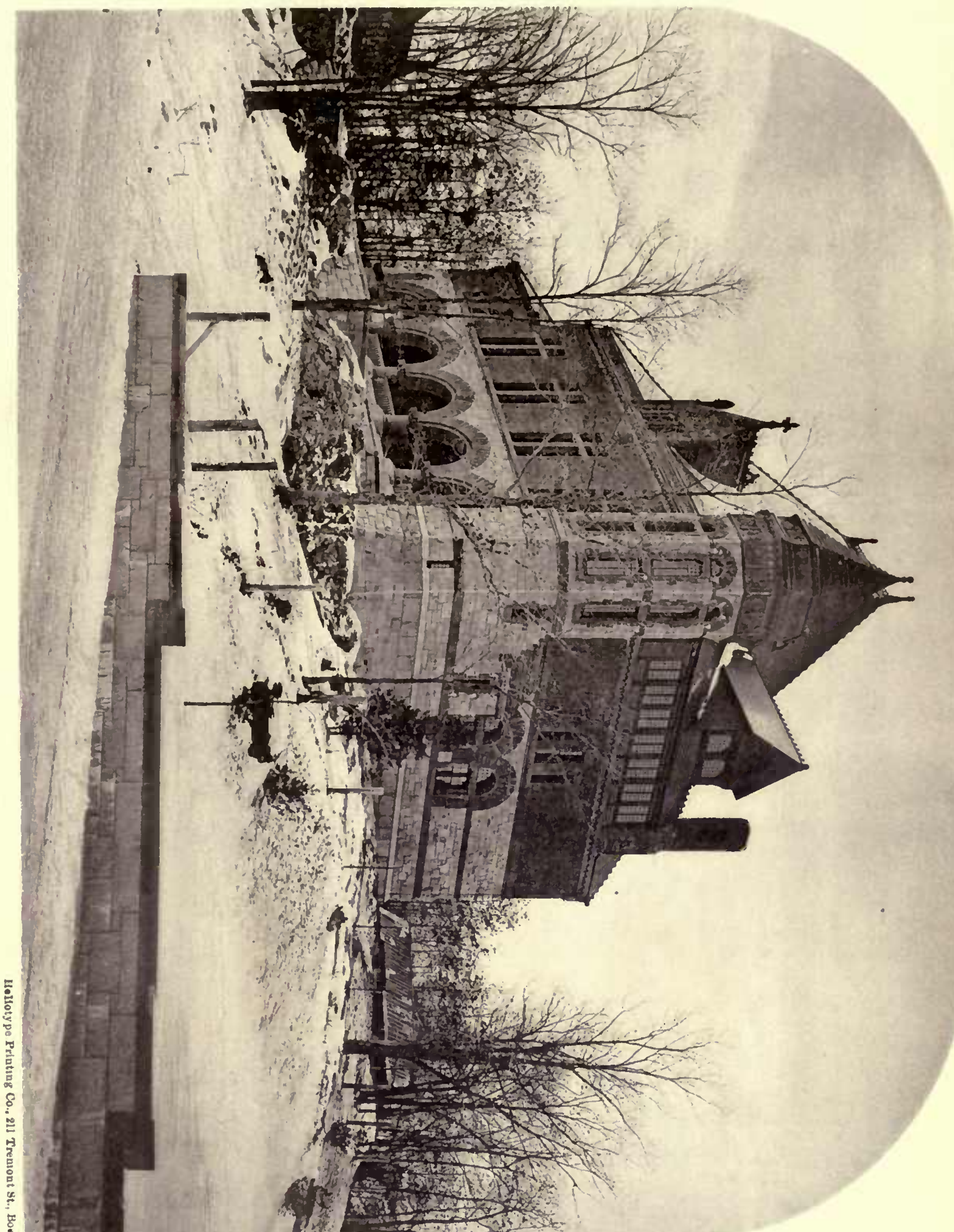
East Dauphin St., No. 434, three-st'y dwell., 16′ x 43′; Geo. Kessler, contractor.

Church St., No. 2729, three-st'y dwell., 18′ x 28′; Geo. Kessler, contractor.

North Fourth St., No. 846, three-st'y factory, 45′ x 60′; E. Schmidt, contractor.

Twenty-first St., s w cor. Sansom St., four-st'y dwell., 30′ x 50′; Stacy, Reeves & Co. contractors.

Germantown Ave., e s, s of Lehigh Ave., two-st'y store and dwell., 18′ x 42′; Jos. Parker.



TOWN HALL, NORTH EASTON, MASS.

H. H. RICHARDSON, *Architect.*

Heliotype Printing Co., 211 Tremont St., Boston.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

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WE happened a few days ago to read in a local newspaper an account of the doings of an official committee, appointed to consider the best mode of securing additional school accommodation for the city to which they belonged. A proposition had been made to build a large school-house in a certain part of the town, and the committee, in reporting back to the authority which appointed them, mentioned, among their other arduous labors, that they "had obtained plans from all the architects out of a job," and had examined them, apparently with an unfavorable result, since they had come to the conclusion that it would be best to look farther for a model. It is not often that we find the common notion of the relation between such official bodies and the architects who pester them with applications "to be allowed the privilege of submitting sketches, etc.," so succinctly expressed, and it is worth while to draw the attention of the younger and less occupied portion of the professional community to the phrase. To the ordinary mind, the idea that a man whose skill is in any demand should need to run about seeking a chance to exercise it for nothing is preposterous; and those persons who are seen engaged in such solicitations are sure to be set down as being, and probably with reason, "out of a job." The natural inference from the circumstance of a man's being apparently without employment is that he is unskilful or incompetent, and the minds of those to whom the gratuitous plan is submitted are thus already prepared to throw it aside at the first unfavorable criticism, and turn with respectful admiration to the contemplation of the designs of architects who may possibly be inferior to the rejected ones in everything except in the knowledge of the way to make themselves and their work respected.

BY the time this paper reaches the press the actual investigation of the charges preferred by Mr. T. H. Murch against the present Supervising Architect of the Treasury Department will probably have begun, unless the whole matter is to follow the example of the Cesnola-Feuardent controversy, which we note has "gone over for a term." Mr. Murch has stated his willingness to begin on Wednesday his attempt to prove his charges, though he expresses a becoming doubt as to the possibility of his substantiating them because the person to be investigated has charge of the documents by which the accuser hopes to convict him. Although, considering Mr. Murch's extreme backwardness in coming forward, this looks a little like hedging on Mr. Murch's part, still, looking at the matter as unprejudiced observers, we cannot but feel that the Secretary of the Treasury was unwise in not temporarily accepting Mr. Hill's resignation. General Grant's theory of not deserting a friend under fire has its weak points, and one is that when a man's character can stand investigation it is injudicious, as far as public opinion is concerned, for his friends to behave as if he were not clothed in armor of proof.

DURING the current week there has been on exhibition at the gallery of the St. Botolph Club, Boston, a small collection of wood-carvings of more than ordinary interest and instructiveness to architects, and one possessing, too, all the attractiveness for an appreciative public that lies in thoroughly artistic work carried out with the highest degree of manual skill. The exhibit consisted of a score or more of unrelated panels, sideboard fronts, cupboard doors, picture-frames and ceilings, shown in miniature and in full-sized sections, sent from the studio of Mr. John C. Bancroft, a gentleman of independent means, of whom it is narrated that, years ago, when some friend expressed surprise that he should lay aside palette and brush, he said that there were enough artists of medium capacity in the world and that he had rather "whittle better than any one else" than occupy amongst artists any other than a foremost place. Whether this remark suggested to him the practicability of developing a career along the line he has lately followed or whether it was made because he had already appreciated his own skill with the jack-knife — which may in this case be held a synonyme for a full kit of cabinet-maker's tools — we cannot guess, but we do know that from that time on he has devoted himself to a line of work which we believe has no other exponent in this country, though it is only within a few years that he has exercised his skill for other than the adornment of his own home. Recently, however, he has undertaken commissions for other people and several New York householders are in doubt whether to pride themselves most on La Farge's stained-glass windows or Bancroft's wood-work.

PERHAPS it is misleading to speak of Mr. Bancroft's work as "wood-carving:" it is rather joinery, as it almost always consists of an infinite number of pieces built up and joined together by mortise, tenon, tongue and cunning dovetail, with all the patient ingenuity that one expects only from the Chinese workman. Almost all the work is geometric in design, and the earlier specimens deal mainly with right lines and are based as a rule on Moorish precedent, recalling the patterns made familiar by the tiles and stucco-work of the Saracenic buildings of Spain; but a careful inspection shows that these are not the work of a mere copyist, but of a thorough master of the rigid laws of geometry, who has as well the delicate perception and graceful fancy of the true artist. Forms have been selected and woods of different hues chosen and combined with, as a rule, unerring instinct, resulting, in some of the latest panels, in a glory of harmonious coloring as restful, as satisfying and as certain to endure the test of time as the best work of the modern glass-stainer. The cunning and knowledge of the workman are shown by the care taken to prevent the warping of the panels by sometimes making the backs of slats whose grain runs in opposite directions, or in other cases of a solid piece scored at distances of an inch or so apart by saw-kerfs sunk nearly to the full thickness of the backing; by the care with which all the pieces of inlaid and parti-colored woods are butted together, with the grain, so that there shall be the least possible shrinkage; and again by the patient care with which in some of the pieces of irregular design the piecing of some of the plane surfaces has been effected by an irregular and hand-made instead of a straight machine-made joint. A curious optical illusion is afforded by three panels of absolutely identical design in woods of three colors, each panel differing from the others in *apparent* design and color through the transposition of the woods; and they also show the truth of the well-known adage that two adjacent colors in decorative design require the interposition of a third color, the woods in the best of these panels being separated from one another by delicate lines of brass inlay—a line of work in which Mr. Bancroft is peculiarly happy. The least successful specimen exhibited is the full-sized section of a ceiling in butternut wood, and the defect lies in the introduction of certain jig-sawed ornaments applied to the spaces left by the geometric pattern in broad raised mouldings. This jig-saw *appliqué*, however good the effect may be — and we admit that in this case it is not absolutely bad — seems out of place in the very midst of such remarkably honest work. It may not be amiss to add that a room entirely finished in wood-work of this kind is in itself a work of art, and all that is to be placed in it should be selected with a view to preserving the harmony of the room as a whole.

THE law just passed by the New York Legislature to provide for the reclamation of the Falls of Niagara seems to have been drawn up with great caution, and bids fair to lead to the happiest results. The basis of the bill seems to have been the report prepared for a former Legislature by Professor James T. Gardiner and Mr. Frederick Law Olmsted, in which it was pointed out that the appropriation to public uses of a very narrow strip of ground bordering the river would be sufficient to keep the Falls themselves from the intrusion of

shabby mill-buildings, and afford the visitor a reasonably quiet and natural introduction to the most impressive piece of scenery on the continent, if not in the world, and the Act, as passed, provides for the appointment of commissioners and appraisers to prepare a map of the territory which it may seem best for the State to take possession of, and an estimate of its value; the whole to be submitted to the Legislature for approval before any farther steps are taken, or any money appropriated for carrying the recommendations of the Commission into effect. Under these circumstances, the collection of contributions in other States for the purchase of the land to be made public, instead of a rather unmeaning freak, proves to be a particularly graceful and timely service to the people of New York, who, in assuming the burden of the Niagara park, make a gift to the whole world which deserves to be appreciated and reciprocated.

LE GENIE CIVIL gives an interesting account of the construction and present condition of the St. Gothard railway tunnel, which, after many mishaps, and an enormous expenditure of money, is now successfully opened to a traffic far greater than had ever been expected for it. The first idea of the tunnel seems to have occurred to the Swiss engineers more than twenty years ago, before the completion of the Mont Cénis line, and in 1864 an association was formed, consisting of delegates from several cantons of Switzerland, with representatives of certain railways, which, under the name of the Réunion du Gothard, made surveys and endeavored to secure the coöperation of the Swiss and Italian governments. After five years' labor they succeeded, and in 1869 a treaty was made with Italy and Switzerland, to which the government of Germany, as being interested in the establishment of a new communication with Italy, free from French control, was made a party in 1871. Every one knows the situation of the mountain of St. Gothard, which divides the watershed of the Reuss on one side from that of the Ticino on the other, separating thus the railway system of Switzerland and the connected lines of eastern France and western Germany, from those of Italy, which extended already to the head-waters of the Ticino, as those of Switzerland did to Lucerne, in the valley of the Reuss, almost at the foot of the mountain to be pierced. As originally planned, and practically as carried out, the tunnel line extends from Lucerne, where connections are made with all northern Europe, along the shore of the lake of the same name to Küssnacht, the scene of some of William Tell's exploits; thence across, behind the Rigi, to the lake of Zug, to join a line carried to meet it from Zurich. From the lake of Zug the route, returning to the lake of Lucerne at Brunnen, continues along the shore to Fluelen at the upper extremity, and thence ascends to Göschenen, where the tunnel proper begins. Nine miles south of Göschenen the road emerges again to daylight on the southern side of the Alps, at Airolo, and descends to Lugano and Pino, where connections are made with the Italian railways.

THE committee of the Réunion had entrusted two engineers, Messrs. Gerwig and Beckh, with the task of making the preliminary surveys and estimates of cost, and their report, that one hundred and eighty-seven million francs would probably be sufficient to complete the undertaking, was made the basis of an agreement, by which the Italian government contributed forty-five millions, the German government twenty millions, and the Swiss railways, together with the governments of the cantons most interested, twenty millions more. In addition to these subventions, stock was issued to the amount of thirty-four million francs, and bonds to sixty-eight millions, the total reaching thus the sum needed. In April, 1872, M. Gerwig was appointed chief engineer, and bids were invited for the work of construction, that of the unfortunate M. Favre of Geneva being accepted in August of the same year. Before beginning work a new level was taken between Lucerne and Lugano, the two extremities of the line, one hundred and twenty-three miles apart, by an independent engineer, with new instruments, in order to test the accuracy of the earlier surveys. The result showed a variation of only about one inch from M. Gerwig's level, proving the care with which the work had been done.

THE skill of the engineers employed was farther shown at the completion of the tunnel by the accuracy with which the two galleries, driven independently from both ends at once, met in the centre; the differences in height being but a small fraction of an inch, while the lateral variation was less than thirteen inches. Their foresight in calculating the cost of the work, was, however, not equal to their technical skill, and in April, 1875, M. Gerwig felt himself obliged to present a new estimate, larger than the previous one by thirty-four millions of francs. As no money beyond the actual amount of the first estimate had been raised, the association found itself thus suddenly obliged to assume a large additional burden for which no provision whatever had been made, and out of resentment at his unwelcome information M. Gerwig was summarily dismissed, and replaced by another German engineer, whose estimates proved even less favorable than those of his predecessor. It was then decided to appeal again to the governments which had originally contributed, to furnish money for the completion of the half-finished work. Some economy was secured by modifications in the plan, and after much discussion thirty-two and one half million francs more were furnished by Switzerland, Italy and Germany, and twelve million raised in addition by the issue of new bonds. This supplied the company with funds for the completion of the work, which is not yet terminated, although trains run regularly through the tunnel.

THE great tunnel through the mountain, although the most interesting portion, comprises but a small part of the engineering science spent upon the line. In the short space of seven and one-half miles where the road passes along the shore of the Lake of Lucerne, between Brunnen and Fluelen, there are three miles of tunnels; and the whole number of tunnels on the lines belonging to the company is fifty-four, having a total length of twenty-seven miles. In many cases the tunnels deviate from a straight line, and on the north side of the mountain, between Fluelen and Göschenen, the railway ascends through three tunnels in the form of a spiral, which wind one above another, just under the surface of the precipice. Besides the difficulties of design involved in such constructions, natural obstacles of the most formidable character presented themselves where they were least expected. In the very heart of the mountain, thirteen hundred feet vertically beneath the village of Andermatt, was found a mass of disintegrated rock, which pressed upon the lining of the tunnel with terrible force. Twice the stone vaulting was crushed by the weight, and a sufficient resistance was only obtained at last by means of a vault five feet thick at the crown, resting on walls nearly ten feet thick. As completed the tunnel is already traversed daily by five passenger trains in each direction, and about as many freight trains, and the number is gradually increasing.

A WRITER in *La Semaine des Constructeurs*, wishing to learn what the workmen of Paris thought in regard to the unfavorable condition of the building industries in Paris, wrote to the Secretary of the Masons' Union, or "*Chambre Syndicale*," and seems to have been rather surprised at having provoked a reply which would do credit to an American demagogue. According to the French "knight of labor," or whatever he may call himself, the present depression in the trade is "the pure creation of the financiers and politicians, who always conspire when they can to take away the working-man's bread." The occasion of this particular conspiracy he and his friends believe to have been the speeches made in the meetings held by the working-men in the hours of leisure which their increased income during a few years past has enabled them to enjoy. These speeches, it seems, treated of the rights of working-men; of the emancipation of labor; of socialism, and the faults of the existing government; and consequently alarmed the financiers and politicians, "who require, in order to preserve their privileges intact, that the working-man should not be allowed to reveal his sufferings, and unmask his despoilers." In order to prevent the impending revelation, the only resource was to "make a crisis, or, in other words, to snatch the bread from the workmen," which was accordingly done; the wily financiers further endeavoring "in order to get the better of the laborers, to provoke them by all sorts of vexations into holding mass-meetings in the streets, so that they might recommence upon them their fusillades of 1848." This luminous explanation of the cessation of building operations, which has the advantage of being applicable, with equal plausibility, to all the afflictions of the working-man, from a toothache to a tariff, may be particularly commended to the school of Pittsburgh and Fall River philosophers.

A FEW DAYS IN RAVENNA.

MONUMENT TO BARNABAS VISCONTI MILAN, ITALY

ONE of the dreams of my life was realized when I found myself in the ancient city of Ravenna, a city unique in its interest for artists and archæologists — scarcely second even to Venice. But what an out-of-the-way place it is! Although only fifty-two miles from Bologna, it takes nearly four hours to get there, owing to much pottering by the way; for after leaving the main line at Castel Bolognese, you seem to emerge from the nineteenth century and retire into the sleepy ages. Very few travellers are to be met, and those few seem to have nothing to do. Our only companion was a young cavalry officer, who, fearful of the night air and probable malaria, huddled himself up in a great blue cloak as we went through the swampy country. The immediate neighborhood has an unpleasant reputation for malarial fevers, but although we were amply warned against it, we astonished every one at Bologna by going, and still more by returning, safe and sound. But who would not run the risk of being laid up, when he has the chance of visiting the Tomb of Theodoric, King of the Ostrogoths, and of worshipping in the same church as the sister of Honorius? Imagine a city whose churches date from the fifth century, and contain mosaics which were nine hundred years old when Dante was buried in S. Francesco! We are apt to look upon Giotto as an old, a very old master, and yet here are Christian works of art, very superior to his, which were seven hundred years old when he was born — a greater distance in point of time between them and his work than between his and ours!

Between Bologna and Ravenna the country is not very interesting, although to artists no country is wanting in interest of some kind. Arrived at the station, we got into a tumble-down old omnibus, leaving our luggage to be looked after by an old, lame man, who seemed almost of the time of the Ostrogoths themselves. From the station to the hotel seemed an endless ride over rough stones, and in and out of tortuous, narrow streets. The Hotel San Marco resembles most Italian inns — a large entrance to a court-yard, a sort of common hall below, where priests, soldiers and workmen congregate, and a great staircase leading up to a long gallery, from which you enter the bedrooms. Mine host met us at the foot of the stairs and conducted us up to our rooms in right regal style. We had heard much of "roughing it," but we had hoped it was only the fastidious who spoke thus. Alas! our hearts sank within us when our host drew aside a very dismal-looking curtain of faded striped stuff, at the end of the passage, and displayed an equally dismal-looking chamber. Similar faded, not to say dirty, striped stuff fell over every doorway — probably the remains of fallen grandeur, a relic of the times when doors of palaces were hung with *portières* of the rarest velvet and silken stuffs; for every Italian house beyond a hovel is a *palazzo,* just as every French country house is a *château.* The curtain drawn aside, we beheld a chamber which in London we would have designated as squalid: the floor covered with matting that cannot have been taken up since Dante's time; an iron washstand, with the smallest of basins and milk-jugs; and a bed — well, not too inviting from its *outer* appearance. Visions of a disturbed night rose up before us, and we hoped some more attractive room might be found for us.

The next day found us refreshed after a good night, and repentant at having libelled our resting-places. Breakfast over, we arranged with the host for a carriage to take us to S. Apollinaris in Classe, and meanwhile, while the horse was being searched for, and put in, we took a stroll down into the town. The Piazza Vittorio Emanuele is surrounded by a colonnade of eight granite columns, supposed to have belonged to a basilica built by Theodoric, and in the centre are two columns erected in 1483, to support statues of SS. Apollinaris and Vitalis. It being market-day the place was full of people, and yet there were no beggars — probably because there were few rich people or visitors to demoralize the poor — indeed, the whole time we were in the place we never saw one; all the people seemed poor, but of the long-suffering, unbegging order of poverty.

The cathedral was almost entirely rebuilt in the eighteenth century, but contains in the sacristy a beautiful and unique work of art — the ivory throne of S. Maximin. It is exquisitely carved, and in style very superior to much later work, seeming to express, as does much of the art-work of Ravenna, the not entirely lost influence of Greece. The boy acolyte who showed it to us turned it round on its pivot with as little reverence as if it had been the most trumpery thing in the world. It is composed entirely of square plaques, two or three of which are missing, and I believe are to be found in the Bargello at Florence. Opposite the cathedral is the baptistery, containing the most ancient mosaics in Ravenna, and in itself one of the oldest examples of Christian circular buildings. Whether the idea of a round building for a baptistery was suggested by the Roman circular temples, or by the buildings which commonly formed part of the Roman baths, is not certain; but they speedily spread to other towns, notably Florence and Pisa. The ground has so risen — some affirm that the building has sunk — that you go down several steps on entering, and the whole building is in want of repair, the mosaic continually falling from the roof. Here I must note the praiseworthy orders of the authorities, in forbidding visitors to take away bits of the mosaic as relics. The roof is domed, entirely filled with mosaic of the fifth century (about A. D., 451). In the centre is the Baptism of Christ. The figure is entirely undraped, and the style is eminently classical; it is accompanied by the river-god Jordan, sedge-crowned, and bearing a linen napkin, as though he were an attendant at a bath. Around, below are the twelve Apostles, carrying oblations in their hands, and clad alternately in yellow garments and white mantles and white garments and yellow mantles. Between each pair is a palm-tree growing, and over each head is the name without the title "Sanctus," which, although admitted into the calendar in 449, does not seem to have been adopted until 472. This seems to have been one of the earliest instances of the Apostles entering into the scheme of ecclesiastical decoration, as teachers of revealed religion. The colors are very harmonious, being mostly blue and green. Below the dome is a kind of clerestory, which has been spoiled by sixteenth-century paintings where the mosaic is destroyed. Still lower down are arched arcades, this and the story above being octagonal. Here, again, is a mosaic decoration, a scroll pattern in blue and green, supported upon columns. In the centre of the building is an enormous octagonal font, having on one side a sort of basin built on, with a cover, on which is a lamb holding a cross.

From the baptistery we made our way to San Vitale, which is perhaps the most interesting church in Ravenna, although it also is spoiled by modern restorations entirely out of harmony with the rest of the building. It was erected in the reign of the Emperor Justinian, over the spot where, according to the Ambrosian legend, S. Vitale suffered martyrdom by being buried alive; and was dedicated by S. Eclesias, about the year 547. Its form is octagonal, with a large vestibule and a small apsidal choir. Over the central part is a dome, supported by eight arches which spring from the same number of lofty and solid piers. These eight divisions are subdivided into two stories, the ground floor forming a sort of circular aisle, and the upper floor a gallery, the pillars of which bear a kind of apsidal recess. The pillars are all antique marble; the capitals Byzantine, a species of abacus smaller at the bottom than at the top, resting upon the elaborately carved volute, thus forming a double capital. The whole of the choir is a mass of mosaic, the rest of the church having been renovated by paintings in the worst taste of the seventeenth century. What the church must have been when it was all mosaic decorations, the remaining part gives us an idea. The subjects are as follows: in the tribune our Saviour is seated upon the globe of the universe; on his right hand, S. Vitale offers his crown of martyrdom, and on the left S. Eclesias presents his church. Round the arch of the choir are medallions representing the heads of the twelve Apostles, S. Vitale and his two sons, SS. Gervasius and Protasius; in the apse, the history of Theodoric. The leading colors are blue, green and gold. Upon the pier at the right-hand side is a fine Greek bas-relief of Neptune sitting upon his shell-covered throne, with his trident, and surrounded by genii. There is a little old glass, but most of the windows have common, square panes of white glass. It was for this church that Baroccio painted the "Martyrdom of S. Vitale," which is now in the Brera at Milan. The exterior is of brick, the roof flat, except over the dome, where it is slightly pointed. It has very much the character of St. Mark's, Venice, and St. Sophia, Constantinople, and is, like both these examples, Byzantine in style. The bricks of Ravenna are peculiar, being rather flat tiles than bricks, separated by bands of mortar as thick as the bricks, in some cases even thicker.

From S. Vitale we went to the mausoleum of Galla Placidia (about A. D. 440), called S. Nazanio. It is built in the form of a Latin cross, rising into a dome where the arms bisect, which, with the rest of the roof, is a mass of mosaic. Over the door is a representation of Christ as a young shepherd surrounded by his sheep. Here it may be remarked that in none of these early mosaic pictures is there any reference to the sad or terrible side of Christianity; the empty cross with a linen cloth over it is the type of the Crucifixion, as if these early artists, following their Pagan forerunners, had in horror any representation of the sufferings of their Redeemer. To them the Resurrection was their principal creed; their God was to be represented as beautiful as was in their power, surrounded by saints in glory, heavenly hosts, thrones, principalities, angels; all was to be joyful. The persecutions of the Christians were so engraven upon their minds — they had taken place within the memory of their fathers — that it was not necessary to record their sufferings in the decoration of their churches, in order to keep alive their faith in immortality. It remained for a later age to resort to menaces of future tortures, and awaken the slumbering faith in the future life. The altar is of transparent alabaster, like the windows of the Cathedral of Pisa. On one side is a large marble sarcophagus, in which the empress was interred in a sitting posture,

formerly covered with silver plaques; on the other side is one which contained the body of Constantius III; and a third was the tomb of the tutors of Valentinian and Honorius. Over the principal entrance are bas-reliefs in white marble, of Lombard workmanship; they refer to the legend of the miracle of St. John's sandal, which runs thus: When the Empress Galla Placidia returned to Ravenna from Constantinople, with her two children, in the year A. D. 425, she encountered a terrible storm. Making a vow that she would erect a church to the honor of St. John if she were safely delivered from the dangers of the tempest, she desired at its dedication to place some relics of the saint in a shrine; it, however, not being the custom in those days to exhume, to buy or to sell the bones of saints, the desire remained unsatisfied. But St. John himself came to the rescue; he appeared to the empress in a vision, and when she threw herself at his feet, to embrace them, he disappeared, leaving his sandal in her hands.

In the lower lunette is represented a tabernacle and altar. St. John offers incense, while the empress, prostrate at his feet, seems to take off his sandal; on each side are his angels. In the upper compartment Galla Placidia kneels at the feet of Christ, offering Him the sacred sandal. On one side is St. John; on the other, Barbation, the empress's confessor. Although not older than the twelfth century, these bas-reliefs are probably copied from earlier mosaics in the interior of the church.

S. Apollinaris Nuovo was erected by Theodoric about A. D. 534, for the Arian Christians. It is in the form of a basilica, and contains exquisite marble columns brought from Constantinople. The mosaics which fill the space above the arches of the nave are most interesting, being representations of the ancient town of Classis, with the sea and ships; the city of Ravenna, with the Church of S. Vitale; and the palace of Theodoric. On the right-hand side is a procession of twenty-one martyrs, carrying crowns in their hands, advancing towards their Master, who is enthroned between angels. On the left is a similar procession of virgin martyrs, who advance towards the Blessed Virgin, enthroned, and surrounded by angels ready to receive them into Glory. Many of the names inscribed over the figures are of saints now almost forgotten; others who are now celebrated are not mentioned. Thus we have no SS. Catherine, Barbara, Margaret, George or Christopher. Between the figures stand palm-trees, as in the baptistery. It was from these mosaics that Flandrin drew his inspiration for the exquisite frescoes in the Church of S. Vincent de Paul, Paris.

We now drove along a road raised up between rice-fields, to S. Apollinaris, in Classe, which it is hard to believe was once a seaport, being now quite two miles distant from the sea. It is the finest of the Ravenna churches, and one of the grandest existing basilicas. The nave is divided from the aisles by a row of beautiful antique marble columns, supporting arches, the inside of which are covered with mosaics. Above is a row of painted medallion portraits of the Popes, of late and indifferent work; above these, plaster walls, formerly, no doubt, covered with mosaic. At the end of the nave is a flight of some twelve or thirteen steps leading to the apse, in which is the altar, surmounted by a magnificent baldacchino, supported by four black Oriental marble columns. The whole of the apse is a mass of mosaic of the sixth century. In the centre of the semidome is a huge cross, below which is a full-length figure of the patron saint, in the habit of a Greek bishop, white, with the pallium embroidered with black crosses; no mitre, but with gray hair and beard. On each side are his sheep, hurrying from the towns of Bethlehem and Jerusalem. There are several fine sarcophagi, one containing the bones of S. Apollinaris. The roof is flat, and of timber. The crypt was quite full of water when we were there; indeed, I believe it always is so, and, in consequence of the late heavy rains, the floor of the church was also flooded. The campanile is round, a peculiarity of the bell-towers of Ravenna, built of rough red bricks.

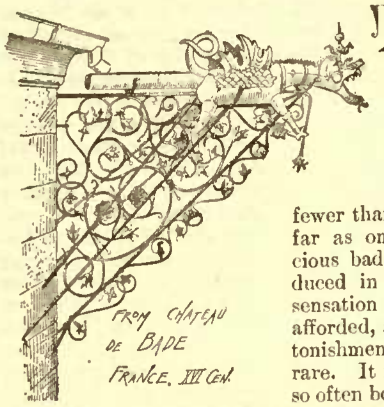
Thence to the Church of S. Maria Fuori is a wondrous drive along a high embankment. It seemed endless and, had the horse been skittish, would have been very unpleasantly dangerous. The church does not repay the time spent in getting to it. There are some frescoes said to be by Giotto, but after those of Florence they are very poor and dilapidated. Returning by the outskirts of the town and the river, we arrived at the tomb of Theodoric, the domed roof of which is of one entire piece of granite. Originally it had a small colonnade round the upper part of it, formed of coupled shafts like those afterwards used in the cloister at Arles; but this has been destroyed. S. Maria, in Cosmedin, is interesting as being a circular baptistery used by the Arians.

In conclusion, I would advise all persons having the opportunity, to brave the discomforts and visit Ravenna. Even if the fare were worse, I should say, go all the same; but by taking a provision of biscuits and mineral water, any one might stay a week or two in the old city very happily, and an artist could find no place so full of interest of all kinds, artistic and natural. Having been there, one's only desire is to return and stay longer, spite of bad bread, bad water, bad rooms, dirty matting and *portières*, and possible malaria.

S. Beale.

An ancient Celtic cross that once stood near Camelford, Wales, was split to pieces and portions used for copings and other purposes. It was a monolith fifteen feet high, and stood in the church-yard of St. Teath. The Rev. T. Worthington, in charge of the parish, has succeeded in getting the pieces together, and will have the cross re-erected.

SPRING EXHIBITIONS IN NEW YORK. — III.



THE chief characteristic of this year's exhibition at the National Academy was, I think, its commonplaceness. It was extremely level, and its level was one of discouraging mediocrity. Very few pictures were prominent for excellence, but then fewer than usual were remarkable — so far as one can remember — for atrocious badness. The chief feeling produced in the beholder was *ennui*. A sensation of real pleasure was seldom afforded, and sensations of amused astonishment were also comparatively rare. It is not necessary to say, as has so often been said before, that the hanging was bad. Some painstaking critic has calculated that while the proportion of works contributed by members of the institution was, compared with those of outsiders, but as one to six, the proportion of places held by them on the line was as one to two, most of their remaining pictures, moreover, filling excellent places in the second row. This would not be unfortunate were the Academical works the best, but another thing which it is hardly necessary again to state is that they were poor, as a rule, and included, indeed, most of the actual atrocities upon the list. The question has once more been mooted: is the Academy for the Academicians, or for the public and the general advancement of American art? Ostensibly the latter is the case, but there seems no way to work a reform which shall convert professions into actualities.

The portraits were numerous, but more uninteresting than usual. Mr. Huntington sent no lady's portrait this year, but four masculine likenesses of such well-known citizens as to prove that his hold on the highest circles of society — that is, on the class who have the most patronage to give, and might therefore do the most good to our rising artists of higher calibre — is unfortunately still unbroken. It is hard to say which was the poorest, the most mechanical, the most insipid and textureless, his portrait of the late Dr. Bellows, of the late Dr. Adams, of Mr. Morris K. Jessop, or of the late Robert L. Stuart. And it is almost inconceivable that an artist who is given such opportunities should use them in such an apathetic way, a way which is indicated — as is the direction of the wind by the traditional straw — by the constant recurrence of the same hideous crimson chair, which seems to be the painter's only studio property. It is unfortunate indeed that three men long so conspicuous in our city and so highly honored by our citizens should be passed down to posterity in such lifeless guise as this; but though our younger portrait-painters were neglected, it is some comfort to know that Mr. Stuart was also painted by Madrazo, in a work which is not one of the artist's very best, but is still in the most marked contrast with that of our P. N. A. The other older portrait-painters were about at their usual level, though Mr. Hicks did rather better than usual with his half-length of an old gentleman with a white moustache, where the artist's pallid tints were more than usually appropriate. Mrs. Anna Lea Merritt, whom we have so long tried to believe in as a promising if not a successful painter, sent a portrait group which did much to quench our hopes forever. It showed two little children feeding a bird, and was a weak and unspontaneous imitation of the English portrait-style of the last century, that is, so far as composition was concerned, and even in execution it seemed as though Gainsborough, perhaps, had been her model, though he was followed far off, indeed, and with a most faltering step. The drawing was defective, the painting thin and hesitating, without modelling, relief, or texture, and expression of life and character was non-existent. Nor could the coloring be called good, though it was not wanting in a certain decorative prettiness. Mr. Eastman Johnson's portrait of a little girl sitting on a staircase was unfortunate in conception and in color, and wooden in effect — altogether below his best achievements. But enough of the failures. It was a relief to turn to Mr. Benoni Irwin's clever, simple, and masculine half-length of Dr. Muybridge, picturesquely yet naturally conceived, with its broad felt hat, and bent gaze directed to a book before him; to Mr. Freer's little study of a girl's head in profile; and to Helena De Kay's profile head with its rich color. It should also be said that Mr. Johnson's portrait of Sir Edward Archibald, though somewhat tormented in treatment, was infinitely better than the child's portrait just noted. Prof. John F. Weir sent a three-quarter-length of Prof. Wells Williams which, like others of his works, came very near being very good. It was manly, straightforward, and apparently very truthful in character; but the one last touch was wanting to make it what even the poorest, much more the best, of his brother's works may claim to be — thoroughly artistic. Mr. Crone, a clever student still in Munich, who — if I may judge by what I saw in his studio last summer — promises to do excellent work when his apprenticeship is over, sent a study of a girl's head, very nice, though low in tone, and showing a feeling for beauty that did not degenerate into "sweetness."

The hanging committee certainly failed to make the most of its opportunities when it consigned to a corner of the corridor Mr. Carroll Beckwith's full-length portrait of a lady. Whatever might be its rank when judged by the very highest artistic standards, it was certainly a striking and effective canvas — deserving the epithet of

"stunning" in ordinary as well as in studio acceptation. It would have made a brilliant centre in the large room, had it been placed there, instead of the dull commonplaces which won most of the posts of honor. It showed one of Mr. Beckwith's usual Frenchified Americans, dressed in the most gorgeous gown of greenish-blue velvet, standing with a smiling face against an equally gorgeous red curtain. The color was too loud to be quite successful, but certainly showed an aptitude which might produce excellent results if guided by a little more delicacy of feeling. The brush-work was splendid, the way the heavy velvet folds were rendered a triumph of boldness and skill; but herein lay the whole interest of the picture — the face was quite subordinate to the dress in execution, and we felt as though it must have been subordinated in conception to the artist's preconceived ideal, so analagous was it with the heads of various sorts he gives us year by year. Some fatal chain seems to bind his hand, so strong and so very clever, and force it to portray forever the same type of feature, and, what is worse, the same type of character — or want of character. Mr. Beckwith has a feeling for beauty of the large, healthy, solid, sensuous kind, which is not without its value in these days of morbid, ugly or emasculated ideals; but he seems able to give it only one incarnation and that of a sort which suggests the *coulisses* of Paris rather than the slopes of Olympus, the fields of France, or still less the drawing-rooms of New York. Their beauty gives all his women a sort of physical distinction which removes them from the common, but not from the unrefined. They are something more than simply sensuous, they are not far from being distinctly sensual. The finest thing he ever did, so far as I can say, was the head of a woman thrown back against a ground of lilac blossoms. It was superbly handsome — but just failed of being *beautiful* by reason of its unrefinement — not in treatment but in the character suggested, and there is the same superbly self-conscious, mundane, Parisian, almost *footlight* expression whether he paints a lady, a peasant-girl, or a would-be goddess. It were too much to say that he has given us no exceptions to this rule, but they have been few, and not among his strongest works. And this portrait is not such an exception — this triumphant, worldly, shallow, coquettish person looks as out of place among the decorously ugly and insipid figures about her as would Madame Croizette at a Sunday-school picnic. If I emphasize the fact it is because in other ways Mr. Beckwith's pictures are so fine — in their handling and especially, as I have said, in the feeling for healthy, vigorous beauty they reveal. And it is therefore a matter of regret that he is lost by his want of sympathy to American art. There are many such pictures at the *Salon* every spring — as clever, as handsome (this is not an "artistic" word but is here the right one) and as "loud." They do not interest us greatly there, but this did interest us in New York, because it was so strangely exotic. I know that few of our painters are really *American*, though more, perhaps, than is commonly believed: but the rest are merely cosmopolitan, as are so many artists of every land to-day. Mr. Beckwith, however, is an actual and very typical Frenchman, and ought to be so classed unless we count a man's corporeal birthplace of more importance in his art than his spiritual affinities. It is not foreign education which makes the difference, but the fact that long residence at home can leave a man in such complete alienation from local facts and feelings that he cannot even see the national type of expression when essaying definite portraiture. As an example of "stunning" brush-work the portrait was, I repeat, admirable; but as a *portrait* it had much less of value. How wide the distance in aim between such a work as this and the one by Mr. Thayer in the other exhibition—one painting the very soul of woman, and the other merely her clothes and her cuticle, though executed, so far, at least, as the clothes were concerned, with the greatest skill and brilliancy!

. Mr. Alexander's portrait of Parke Godwin was rapid and bold to such a degree that it was absolutely fierce, if I may so say, in technical effect; but it was extremely strong, and in spite of the chalky flesh-tones which he does not escape from, appeared a vital piece of characterization. William Page, who seems almost like a ghost on the walls of a contemporary exhibition, was represented by two portraits painted long ago, one of the late Mr. Le Clear and the other of Col. Shaw; the former much the more interesting of the two. The other was rather hard and mechanical in effect, but Mr. Le Clear's portrait, in spite of the thin painting and the small care for textures, was full of life and character and sentiment. Mr. Page's work looks archaic to-day, and we feel that he never realized, perhaps, all that he was aiming at; yet we feel also that it is what most painting, even some accomplished painting, is not — artistic and *interesting* — that he had a true and peculiarly individual *tempérament d'artiste*. He was one of the few true painters of his generation, as distinguished from the mere men who painted — one of the few born with a natural gift, an artist's soul. His work has been less studied than it deserves, but a day will come, I am sure, when he will be given his rightful place in our little Pantheon — and it will not be a low one.

In landscapes the exhibition was unusually weak. Even Mr. Inness was below his very best with a rather sketchily handled large canvas showing cattle, and trees, and grass bright with the vivid green of early summer. It was less poetical, less complete than his finest works, but had one point in common with them—its beauty of composition, a point in which Mr. Inness stands absolutely alone among our painters, and with few living rivals in other lands. Mr. Picknell was again as disappointing as in the other exhibition, and Mr. Walter Palmer had less than his usual success with a yellow-toned field and a sky with heavy clouds. Mr. Thomas Moran sent a large view of the "Pass of Glencoe," with mountain tops, and heather, and misty clouds — English in manner, as well as in subject, and excellent throughout, being far less pyrotechnic than many of the artist's recent efforts. Mr. Twachtman was again well represented; his large "Summer" being fine in composition — and in color also, spite of its low-toned, heavy greens. This sort of landscape-painting is as far as possible from Mr. Moran's, being all feeling instead of all a careful reproduction of natural details. It depends, of course, upon the spectator's standpoint which art he will prefer. As yet Mr. Twachtman's seems a little above the comprehension of the Academy, to judge from the position in which they placed this, one of the most interesting pictures of the collection. Mr. Donoho sent a large canvas which, with the one at the other exhibition, had figured last year in Paris. They well showed his versatility, this being sunny and green, a view in a thickly-planted park, apparently. Not so original in subject as the other it was yet a strong and charming picture. Mr. Poore, of Philadelphia, sent a promising picture of a man ploughing in early spring, and Miss Amanda Brewster a small Adirondack sketch remarkably nice in color. Mr. George Inness, Jr., bids fair to supply us with what we greatly need — a good painter of animals. It is curious that we have thus far had so few to attempt this branch of art, save as a mere adjunct in landscape painting. The late Mr. Bispham was about the only American who devoted himself to animal portraiture, properly so called — for Mr. Beard can hardly be taken seriously. Mr. Inness's capable, large picture of cattle was therefore doubly welcome.

It was impossible not to institute a comparison between three harbor views, which all hung in the same room, and between each of them and the well-known pictures of Baron Clays. These were Dutch scenes by Mr. Gifford and Mr. Tryon respectively, and Mr. Quartley's "Queen's Birthday in New York Harbor." The last was apparently inspired by Clay's Antwerp Fête in the Metropolitan Museum, and although there was good in the way in which the bright bits of color had been managed so as not to look actually spotty and disagreeable, it was an exemplification of Mr. Quartley's worst sin — the painty, kaleidoscopic and unnatural look he gives to water. It is an exaggeration of a way of working into which Clays himself not seldom falls. Mr. Gifford's work was well able to sustain a comparison with that of the Netherland painter, and was much less visibly under his influence. Both here and with Mr. Tryon the case was not one of imitation, but merely of similar results attained of necessity in painting identical scenes. But Mr. Tryon was the man who came out best of all in the enforced comparison. His broad river with its rapid though heavy craft was an admirable bit of work. Not Clays himself, so far as I know his work, ever painted water quite so well, though he has done better than Mr. Tryon can yet accomplish in the way of color and composition. Mr. Gifford's "Grove" should not be forgotten, a specimen of his very best mood and manner, nor Mr. Alexander Harrison's charming little picture of children under a blossoming cherry tree, nor Mr. Percy Moran's "Woods in Winter," — painted in a style more suited for decorative than representative work, but very delicate in feeling, and very cleverly free in touch. But it was when we turned to the *genre* pictures that we found the most interest to reward our rather dreary labors. First among them—first in the exhibition, and one of the most valuable and hopeful pictures of the year — was Mr. Ulrich's "Glass-blowers." I have already said that Mr. Ulrich is recently home from Munich, and that he belongs to the "Realistic" School, but his realism does not carry him outside of artistic work, and his foreign residence has not prevented him from turning his attention immediately to home themes. These Glass-blowers, who are doing nothing more important than making eyes for the taxidermist, were studied in New York, and painted with fine sympathy and psychologic truth as well as nice attention to details of texture, form and color. They were seven or eight in number, and were grouped around a long table which ran away from the spectator, each having his tiny gas-jet just before him. The painting was exquisitely careful, yet exquisitely free — minute work after the manner of Brouwer, where every stroke tells and shows its value, not after the manner of Gerard Dow, where all is polished and blended into a porcelain-like surface. The characters of the heads were extremely well studied; the color, with its most prominent note in the blue shirt of the nearest workman, was sober and good, and the management of the difficult lighting was admirable. Altogether it was, I think, a faultless little work in its way, not only in execution but in aim and feeling. Those of my readers who did not see the exhibition may get an idea of the picture from a full-page wood-cut which appeared in *Harper's Weekly* some weeks ago, though it must be said that this gives no notion of the delicate handling of the work. Another picture by Mr. Ulrich called the "Amateur Etcher" was much less successful, especially in color. Mr. C. Y. Turner sent a number of figure compositions none of which deserved much praise, except the canvas with two figures called "Preparing for yearly Meeting." Mr. Harrison's "Two Pipes," a man smoking and a boy blowing bubbles, was well studied, but wilfully awkward in composition. Mr. Irwin's "Stitch in Time" reminded one of the figures of the Englishman Nicholl. Mr. Flagg's "In the Studio" was remarkable for the way the flood of strong light falling on objects that were white or very light-colored had been rendered. M. Koehler's woman with a broken sewing-machine—called "Her Only Support" was a good if not remarkable composition, as was John Hammer's "Gathering Field Flowers." Mr. Hovenden's "Village Blacksmith" was well done, but an awkward compromise between a portrait and a *genre* painting. Mr. Burr

Nicholls had a number of sunny little views, very nice in their light scale of color; Mr. Volk, a small snowy landscape which, both technically and in sentiment, was miles below the one that won him such fame two years ago; Mr. Millet, a group of uninteresting and un-Hellenic maidens ranged in a row, and supposed to be listening to the Story of Œnone; and Mr. Blashfield, a study for a portion of a decorative frieze for a music-room, typifying by means of many figures the "Allegro and Andante" measures. This last but just escaped being a very successful essay, and had at all events a definite aim and significance too often lacking in decorative work. This, it seems to me, is the true bent of Mr. Blashfield's talent, and not the painting of *genre* subjects. Mr. Weldon sent the most popular canvas of the year, called "Dreamland," showing a child fallen asleep with a Paris doll in her arms and a procession of Japanese dolls approaching her over the sofa on which she sits. The painting was very clever and the color nice, and we half forgave the use of so trivial a subject — better fitted for an illustration in *St. Nicholas* than for a work of serious art —in view of the really and legitimately amusing way in which Mr. Weldon had put character and expression into the quaint Japanese faces and disjointed little figures. It is a long jump from this to Mr. Homer's finely serious, dignified and impressive "Coming Away of the Storm,"—a picture belonging to the same English series as the water-colors I lately noticed. This gray wind-swept sea, and heavy yet luminous gray sky were wonderfully well done. In the foreground was a splendidly vigorous young woman with a baby strapped on her back striding through the storm along the pier to where a group of sailors were launching their life-boat. The picture had not so much of beauty as the smaller *aquarelles*, but all their individuality and strength. Finally, Mr. J. L. Stewart, son of the well-known American collector in Paris, and a young man much esteemed among his French associates, exhibited for the first time, so far as I remember, in New York. He sent a medium-sized canvas with two girls dressed in the latest Parisian fashion, reading a letter, which was called "A Proposal." There was little meaning or originality in the work, but it was a fine specimen of brush-work.

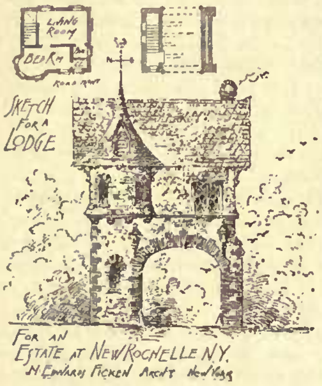
The visitors to the exhibition are reported to have been just about as numerous as last season, but they may be presumed to have taken more interest in what they saw, since a much larger number of catalogues were sold. The aggregate price for the pictures sold is given as $40,000—again a figure which corresponds with that of 1882.

M. G. van Rensselaer.

THE ILLUSTRATIONS.

CHIPPENDALE FURNITURE.

[From the *Building News.*]



Few workers have influenced their craft more than Thomas Chippendale, and few designers of furniture have secured so lasting a fame. This fame was honestly worked for and won, for not only did this master bring thoroughly good material and workmanship together, but he invested his productions with an originality and charm which, though said to have been borrowed from the French, gave to his designs a spirit of freshness all their own. Some of the furniture bearing his name is evidently due, from a careful study of his works, either to his sons or assistants, and with considerable reason it is thought that the singularly fantastic, and over-elaborated looking-glass frames, ceilings, and curious contemporary furniture, designed in a sort of Chinese manner, must have been due to his associates. It is undoubtedly true that Chippendale himself degenerated in his designs, as he became more known, and consequently more extensively engaged, and also when he endeavored, later in life, to produce works of still further originality. The faults we refer to are rather those of conception than of failure in mechanical execution, for in these particulars the most difficult tasks were undertaken, and thoroughly well carried out. Frequently, indeed, these same difficulties, trying as they did the cabinet-maker's technical skill to the utmost, were the result of that struggling after novelty already alluded to. The drawings which we publish to-day scarcely illustrate the diffuse character or extent of excess in this particular to which Chippendale's work was sometimes carried. The industry of Chippendale must have been most constant, and his designs, published in 1753, and again some ten years later, comprise almost every variety of work peculiar to his trade, while from unpublished drawings we know that, like furniture designers of most periods, he was extensively engaged on carriages, and sometimes on organ-cases. Every form of movable furniture and cabinet-work he seems to have designed, as well as chimney-fronts and interior decorations, but in these latter attempts he was by no means so happy, and evidences of help from French artists show that the limits of the master mind were occasionally overreached. The earliest turnings of taste towards the movement afterwards known as the Gothic revival were at this time attracting attention, notably Horace Walpole's villa at Strawberry Hill, and Thomas Chippendale, influenced by the coming fashion, made some very strange attempts to master the spirit of the style, of which, indeed, he really, of course, knew nothing. In the centre of our plate to-day, we reproduce an example, to scale, taken from one of the author's own drawings, with some of the mouldings enlarged. The central part of the upper body, with "Gothick pillars fixed on," is a door, and "hath a glass," intended to be silvered or left transparent, with ornamental sham tracery and carved swags, all executed in wood, extending over the surface, as indicated. The drawer below this door reaches the whole width, regardless of the scroll-like feet, which form fancy bases to the clustered columns before mentioned. These feet are carved out of the solid drawer-front. Two rather deep drawers occur on either hand of the central cupboard, and above are two double niches with open fret arches and plain turned dividing uprights. The foliated and curve-shaped gable evidently was intended to secure a "Gothick" character; but the fussy excrescences at the ends of the cornice taking the forms of vases filled with flowers, "all a-blowin' and all a-growin'," carry the work away into that class of meretricious design which has previously been noted. The legs are gracefully pierced with open ways, taking the form of a cross on plan; but the feet called "Term feet" are only in keeping with the cornice enrichments. The exact profiles of the table-top, shaft-bases, and main cornice are drawn out large. Turning now towards the more characteristic and really more representative designs of Chippendale's work which occupy our double-page plate herewith, the "desk with bookcase over" may be quoted as the most admirable example. Like the "Gothick" cabinet, it has a glazed central door, inclosing divisions for books, but a loss of space, available for ready use, is occasioned by the beautifully carved fronted bays on either hand. These, it will be observed in our drawing, furnish alternative patterns for the carver. The main cornice, surmounted by a carved and broken pediment, carries three sculptured busts, the larger of the series being in the centre, and all playing an important part in the general composition. A detail of the cornice moulding is affixed, with sections of the base and plinth mouldings. The fall-down flap-desk occupies the usual place, and below are two cupboards with shallow drawers over, and a chest of drawers in the centre. All are elaborated with surface-carving, executed in fine and sharp foliage out of solid dark mahogany, offering a surface as wear-resisting almost as iron. The several figured dimensions are given with the perspective diagram. On the other side of the plate we show an escritoire, bearing the date of 1760, and this is an unusual shape, and one seldom met with. A bookcase with silvered-glass door commands the whole upper part, and measures two feet nine inches wide, three feet two inches high, and one foot one and one-half inches deep. It is divided into two panels by a moulded shaft with cap and bases. The deep plinth-like moulding to this upper part is arranged in two halves as drawers, the joints being carefully ignored. The fall-down flap, as before, splays off and incloses the customary drawers and niches adaptable for writing purposes. Three drawers of useful size take their place in front, and the whole piece stands on shaped legs, rich with surface-carving, while a continuation of this work runs round the ornamental verge. Three chairs figure on our sheet, and to all alternatives of treatment are given at once, showing how soon Chippendale secured a variety of design by his facile power of ornamental design, though, indeed, so thoroughly did the author depend upon general elegance of outline and proportion for his effects, that he himself has left on record an old saying of his, that "should the small ornaments be thought superfluous, they may be left out without prejudice to the pattern." The heights of the backs generally measure twenty-two inches above the seats, which were mostly covered with curtain damask or woollen stuff, fixed down with brass-headed nails. The maker, of course, preferred morocco fastened with brass borders neatly chased, or as usually now done, ribbed at the angles with a piping of leather on cord. The strength of these chairs, even with a hundred years' wear, is the best test possible of the extreme skill and care with which they were made, and the remark gains emphasis when the very light scantlings of the members are taken into account. The "Ribband" chair is a good typical specimen of its class. The sofa figuring in the middle of the bottom-half of our lithograph is smaller in scale than the chairs, but the sketch is amply large enough for the purposes of illustration. The ordinary size of Chippendale sofas, like all other lounges, is about six feet to nine feet long, and the backs or elbows measure about one foot seven inches high. The depth of the seat is two to three feet, and the elevation of the seat is one foot two inches besides the caster. In larger sofas a cushion and pillow at each end were provided, and in smaller ones cushions behind resting on the back. Originally a carver by trade, Chippendale often allowed his love of rococo, fancy and redundant ornamentation to ignore the first principles of design necessary for the purposes of every-day furniture as well as for articles intended for simple uses; but he was seldom commonplace, and never vulgar. To strictly copy or reproduce any of his designs now would serve but little good purpose, though in many ways the type of design indicated by his work is clearly more in harmony with the spirit of modern domestic life and customs than the so-called Gothic furniture which not long since had its day. Curved shapes and retiring lines are surely better adapted for present wants than primitive square angles, however

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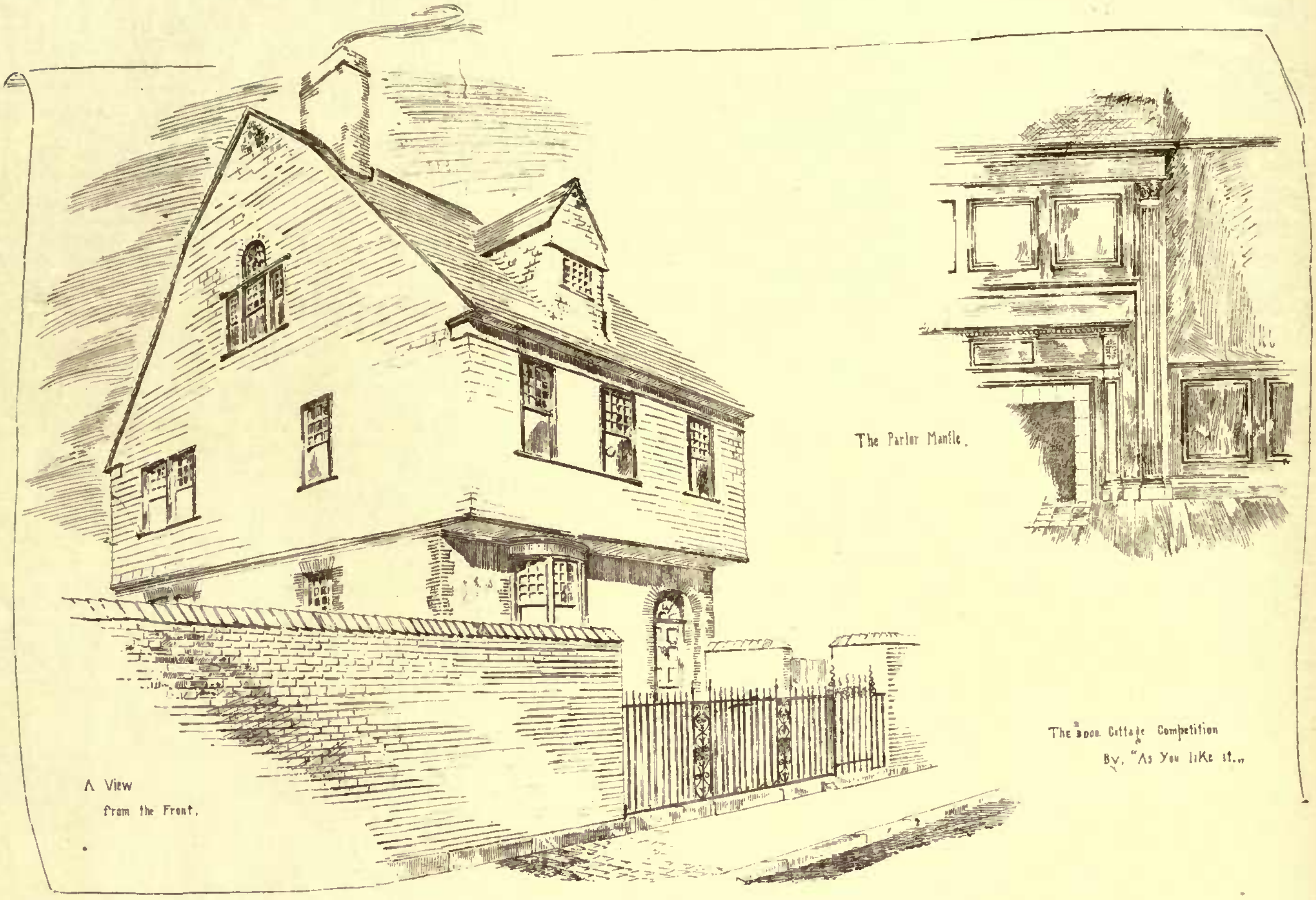

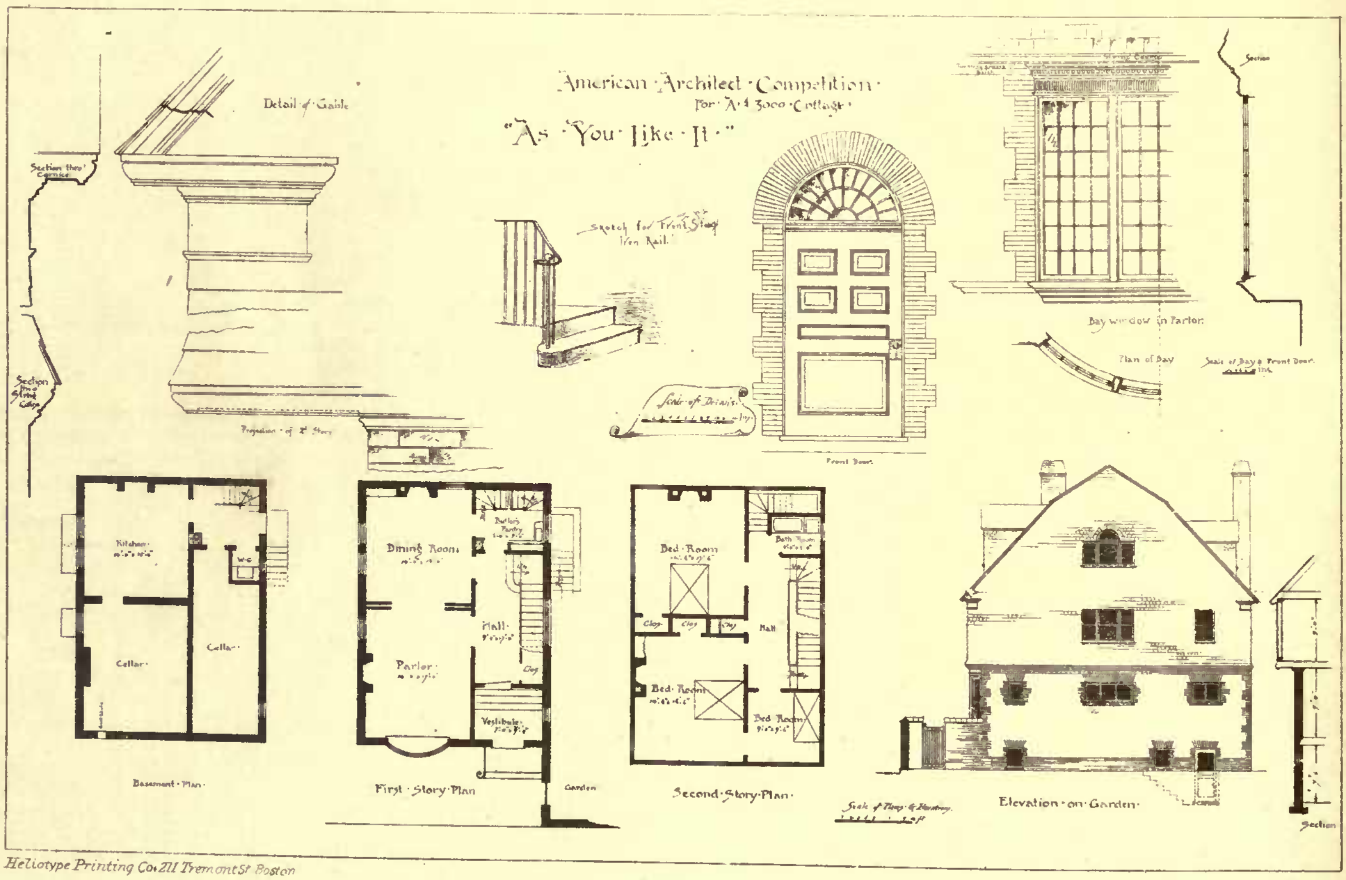

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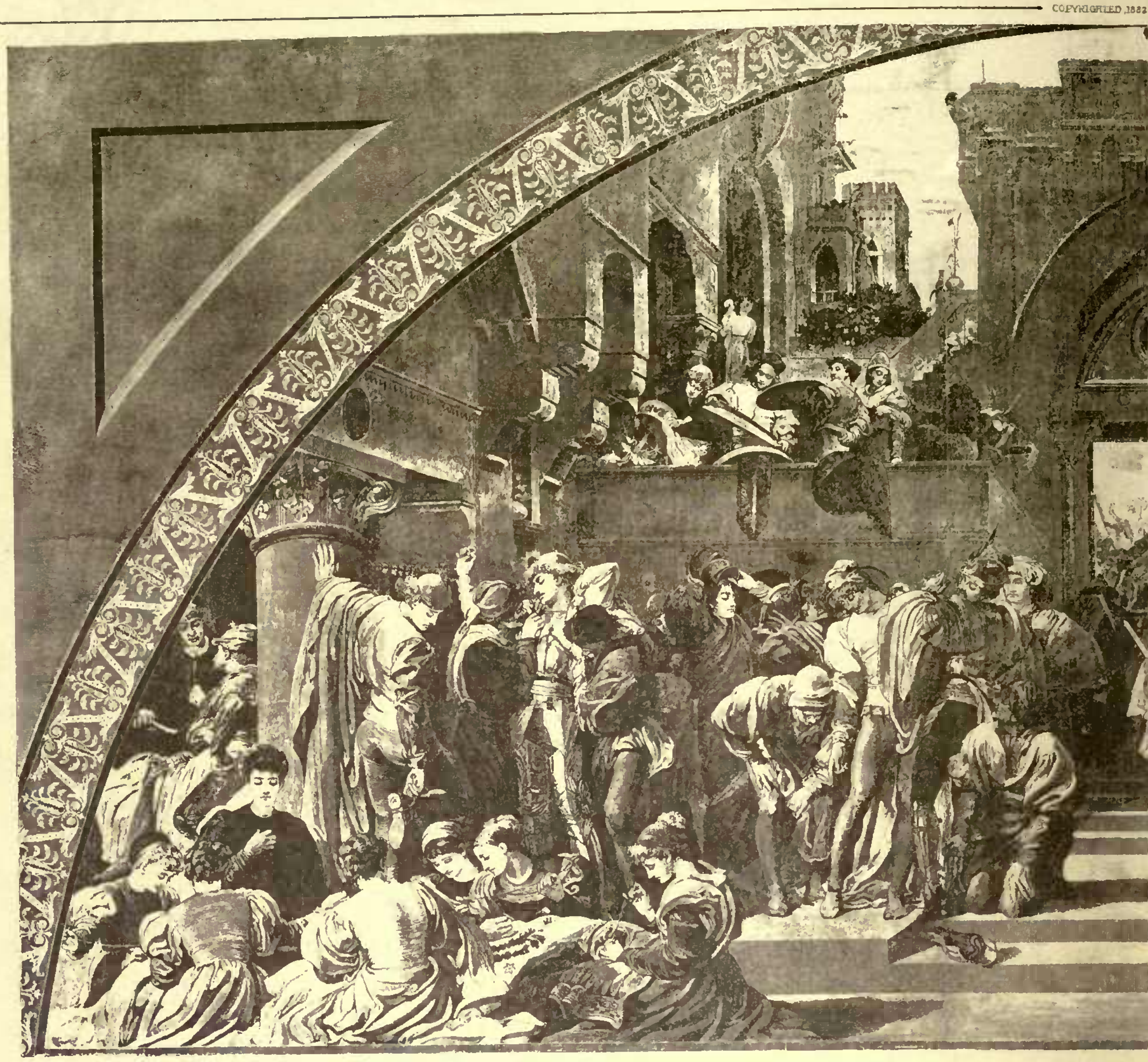

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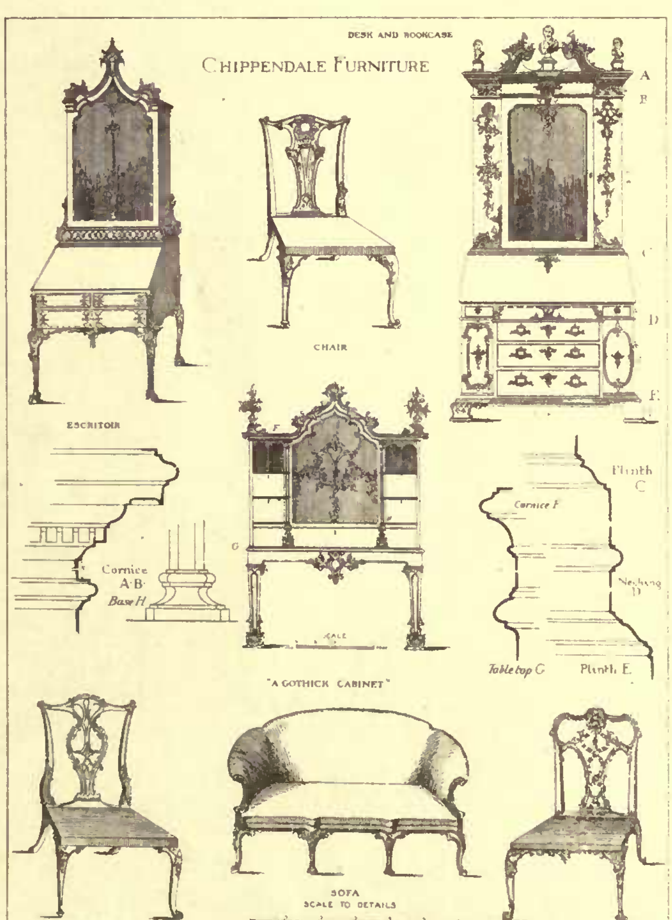

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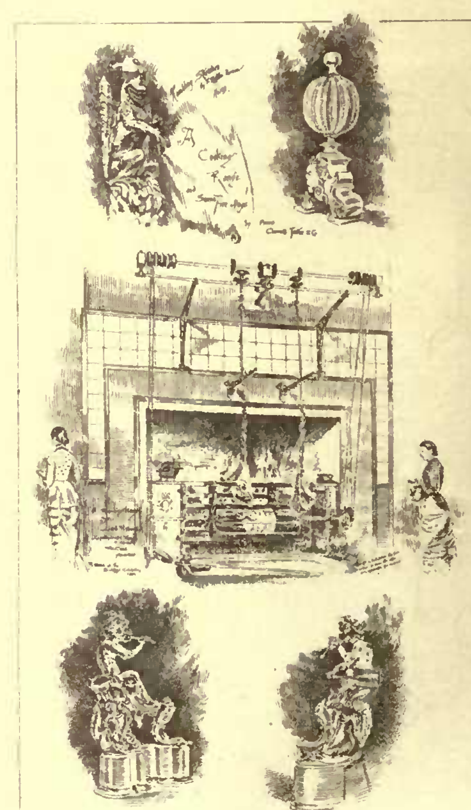

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EXCHANGES XV.

THE GRAPHIC.

...TS APPLIED TO WAR"

...I, P.R.A., IN THE SOUTH KENSINGTON MUSEUM

PORTE DE L'ÉVÊCHE, A SENS

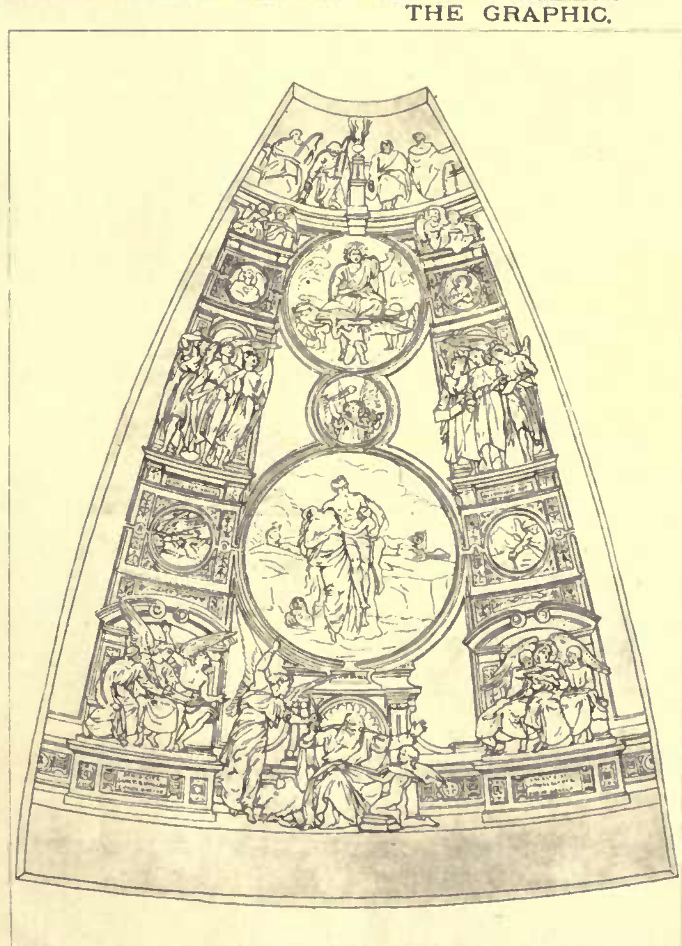

Diagram shewing Proposed Decoration of a Part of the Dome of St Pauls Cathedral

The Architect

... Tremont St Boston

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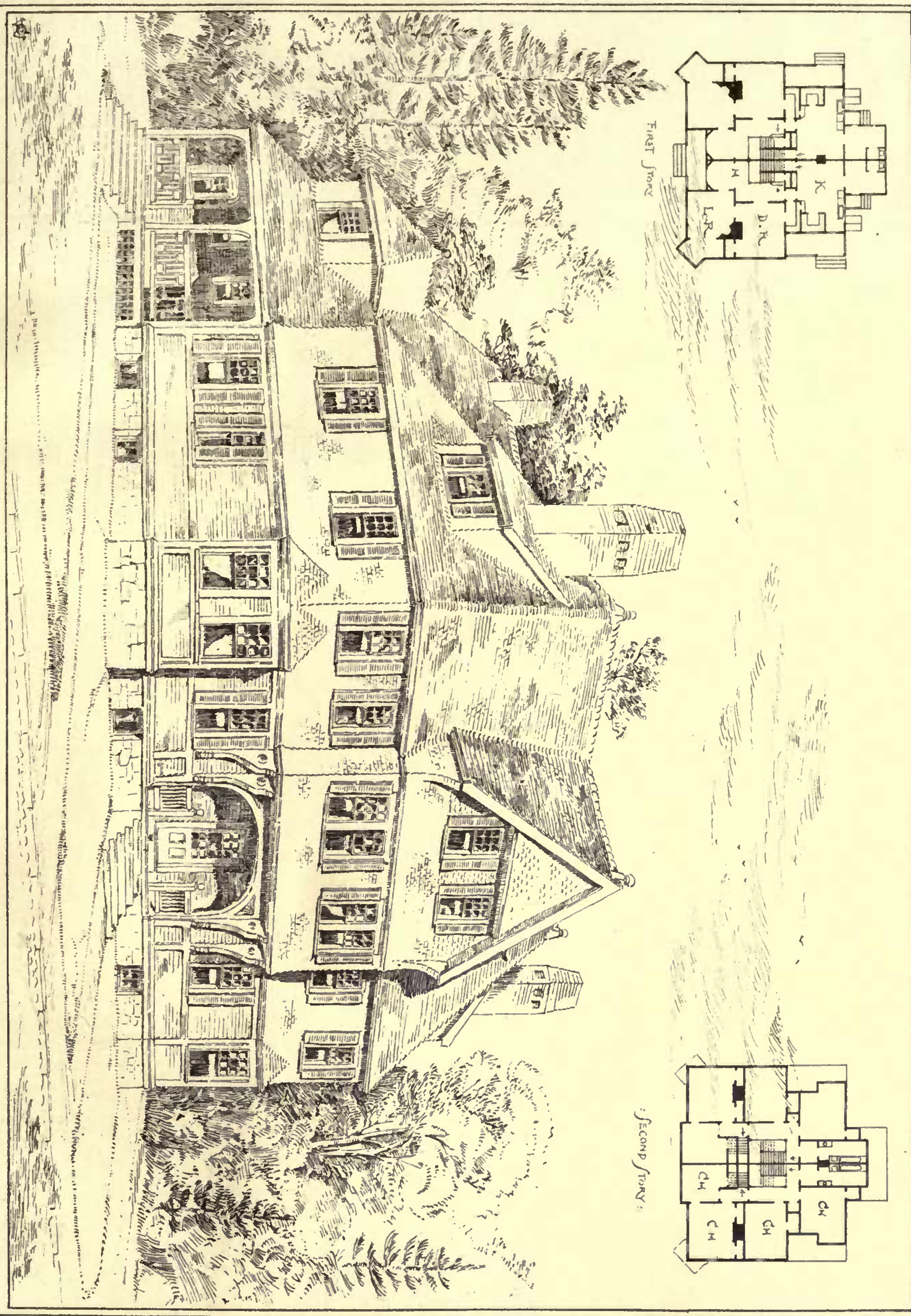


DOUBLE HOUSE AT MALDEN, MASS. FOR W. B. DE LAS CASAS. HARTWELL AND RICHARDSON, ARCHTS. 68 DEVONSHIRE ST. BOSTON

Heliotype Printing Co. 211 Tremont St. Boston

admirably elaborated with the stop-chamber so dear in the days of Gothic Revivalism.

PORTE DE L'EVECHE, SENS, FRANCE.
[From *L'Art*].

DESIGN FOR THE DECORATION OF THE DOME OF ST. PAUL'S CATHEDRAL.

[From the *Architect*.]

WE publish this week a rough sketch or diagram to indicate the nature of the proposed scheme of decoration for the dome of St. Paul's Cathedral, on which Mr. Poynter, R. A., is engaged. The following description accompanied the original model of the segment from which the sketch has been taken: —

The dome will be divided into eight parts by upright architectural ribs. In each space between the ribs will be two large round panels, 20 feet 8 inches and 12 feet 8 inches in diameter respectively. Round the base of the dome, and supporting the circular panels, will be eight thrones or architectural seats, one of which is shown in the model, and contains the figure of St. John the Evangelist receiving inspiration to write to the seven churches (Rev. i, 11). On the corresponding seven seats will be the bishops of the seven churches. In a circle above all will be the four-and-twenty elders, four of whom are shown on the model.

The circular panels and medallions will contain the visions of the Apocalypse. Of the large panels, the upper one represents the Vision of Christ in Judgment, with the Book of Life open before Him (Rev. xx, 11); the lower, the dead rising from the sea (Rev. xx, 13). In the small panels on the ribs will be visions of woes which fell on the earth. In the panel to the left the sun is darkened (Rev. vi, 12). To the right a burning mountain falls into the sea, which is changed into blood (Rev. viii, 8 and xvi, 3). In the medallion between the large panels is the angel with the censer (Rev. viii, 3). The corresponding seven medallions will contain the seven angels with the trumpets (Rev. viii, 2).

The groups of figures on the ribs illustrate the chorus of praise to the Lamb, which accompanies the fulfilment of the visions in the Apocalypse: "Every creature which is in heaven, and on the earth, and under the earth, and such as are in the sea, and all that are in them, heard I saying, Blessing, and honor, and glory, and power, be unto Him that sitteth upon the throne, and unto the Lamb forever and ever. And the four beasts said, Amen. And the four-and-twenty elders fell down and worshipped Him that liveth forever and ever" (Rev. v, 13, 14,). The lower groups represent the holy on earth, and illustrate appropriate texts from the Psalms of Praise. Each group is accompanied by an angel or heavenly muse, who inspires them with the spirit of praise. Above are the angels who stood round the throne; alternately with whom will be the martyrs (Rev. vii, 9-12), symbolized by groups of three on each rib, with two youthful angels on each rib. The whole is crowned by the circle of angels.

The central panel was designed by Sir Frederick Leighton, P. R. A., and a reproduction of the original cartoon was published in *The American Architect* on April 28.

SIR FREDERICK LEIGHTON'S WALL PAINTING AT THE SOUTH KENSINGTON MUSEUM.

[From the London *Graphic*.]

A MURAL painting, filling a lunette space, some twenty-six feet long by thirteen feet high, in one of the principal courts of the South Kensington Museum, has been completed in a process called "spirit fresco," by Sir Frederick Leighton, the President of the Royal Academy. The picture shows the interior of an Italian armorer's yard in the fifteenth century; and a flight of broad shallow steps leads up to the Italian Gothic gateway which forms the central mass of the composition. On either side of the gateway project two parapeted platforms. Upon that which is on the left-hand side are men repairing or cleaning circular and pear-shaped shields. On a more remote terrace at the back a woman is seen nursing her baby, while a little child is clambering up to the steps leading to the upper part of the gateway. On the right-hand platform are customers, to whom banners are being displayed by attendants. Beyond them rise houses and buildings, under a sky overcast with white clouds. Turning now to the lower portion of the picture, on the extreme left, inside a storeroom for stuffs, is seen a foreman giving instructions to a journeyman. Seated in a yard, close at hand, a group of embroideresses are at work upon jerkins and mantles. On the extreme right of the lunette some smiths are at work with uplifted sledge-hammers. Next, dispersed about the steps of the yard are the armorer's customers, young men clad in rich and picturesque dresses. One is trying on a suit of fluted and gilded armor; another twists his head to catch a back view of the fastening of his greaves, which a stooping artificer has strapped onto his leg; another, supporting himself against a pillar, is bending backwards to ascertain if his spur is securely fixed to his heel. Through the central gateway is seen a knight on his charger. Then there are groups of nobles examining arms, such as swords and arbalets; a crouching smith, who has strewed at the feet of his customers an armful of weapons; and a party of connoisseurs inspecting cross-bows.

"Spirit fresco," the process employed by Sir F. Leighton in this painting, is declared to be free from the risks of decay arising from defective pigments, loosening of the intonaco, and efflorescence. It was invented by Mr. Gambier Parry, and it has been highly commended by experts for its transparency of effect, and its quality of drying with a dead surface. The plaster employed is a good common stucco, and oil of spike is used as a vehicle for the colors. When the whole process has been carried out, the surface is as hard as marble, and quite smooth. Further information on this subject will be found in an interesting article in the *Builder* of February 28, from which we have condensed the foregoing details.

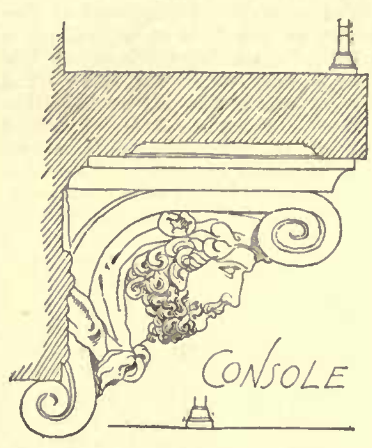
COMPETITIVE DESIGN FOR A $3,000-HOUSE SUBMITTED BY "*As You Like It.*"

SHOULD any of our non-professional readers desire to build according to this design, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

"'*As You Like It*' has a very economical plan as far as its area is concerned, but in putting his kitchen in the cellar, and making his first story of brick, his expenses in reality will push hard upon our widest limits of cost. Drawing-room and dining-room can be thrown into one spacious *suite*, giving an appearance of generous size in spite of the careful economy shown elsewhere. The bedroom story is simply arranged, with two large and one small chamber. In the attic there is space for several rooms. The perspective shows a straightforward elevation with a gambrel, which, if not quite satisfactory, is better than most attempts to use this kind of roof. The judicious simplicity which the author shows throughout his design makes the jury especially regret that it arrived after the prescribed time, and was therefore put *hors de concours*."—*Extract from Jury's Report.*

DOUBLE HOUSE FOR W. B. DELAY CASAS, MALDEN, MASS. MESSRS HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

THE $3,000-HOUSE COMPETITION. — XII.



SPECIFICATION governing material to be furnished, and work to be done in building a cottage for "*As You Like It*" at a cost approximating $3,000.

Excavation:—Excavate for cellars, foundation-walls, areas, etc., as shown and figured in drawings. Make such disposition of earth as may be directed.

Brickwork: —Foundations—lay two courses of stepped brickwork for footings. Bottom course 8″ wider than wall above. All brickwork to be of good merchantable hard-burned brick. Build basement and first story walls of brickwork as shown. Quoins at angles, and reveals to be of selected brick laid with neat joints; these to project 1″ from face of wall. Turn round and flat arches as shown, in same brick.

Build chimneys as shown. Build proper fireplaces, four throats and flues.

Stone Steps:—Furnish and set bluestone steps at front and in area steps. Bluestone coping on area walls, 2½″ x 9″. Make cut-brick sills to all basement and first floor windows.

Rendering on Brickwork: — Render outside on brickwork, flush with quoins, with cement-mortar compounded with Portland cement, common mortar and fine washed gravel, with slight admixture of yellow ochre.

Framing: — Frame house above first story. Sills, 4″ x 6″, studs, 3″ x 4″, corner posts, 4″ x 4″. Floor beams, 2″ x 10″, 16″ on centres. Rafters, 2″ x 8″, 24″ on centres. Plates, 4″ x 4″. Floor beams cross-bridged once in each 8′ of span, with 1½″ x 2″ bridging.

Sheathe outside of frame with ⅞″ close sheathing, sides and roof.

Sashes and Doors: — Window-frames, except as shown, to be box-frame for double-hung 1½″ sash. Sunk sills, steel axle pulleys, best hemp cord and proper weights. Other frames, for 1½″ casement windows opening out.

Furnish with good cast-iron, loose-pin butts and brass fasts.

Door frames 1¾″, rebated for 1¾″ outside and 1½″ inside doors.

Sash 1½″, glazed as shown, with single-thick French sheet-glass.

Allow $50.00 for glazing in stairway window.

Outside doors, 1¾″ thick, seven panels; inside doors, 1½″, six panels, moulded and raised both sides.

Doors to have brass-faced mortise-locks, and plain brass butts, knobs and escutcheons.

Outside Work: — All the outside, above brickwork, to be shingled with best sawed white-pine shingles, 5½″ to weather. Prepare and fix moulding under frame, moulded sills, cornice and all other outside work as shown. All executed in clear white-pine.

Inside Work: — Floors 1″ thick, 4″ wide, grooved, and tongued, and blind-nailed.

Hall, Parlor and Dining-room of yellow-pine, others of white-pine.

Inside trim, ⅞″ thick, 4″ wide, moulded; 9″ moulded bases in first floor, 8″ in second.

Parlor wainscoted 2′ 8″ high. Square moulded panels, with cap.

Allow $50.00 for Parlor mantels.

Dining-room to have picture-strip.

Allow $40.00 for mantel.

Hall to be wainscoted 7′ high, with beaded ⅝″ narrow stuff, with base and cap. Main stairs to have cut string and returned nosing. Turned newels and balusters, three to each step. Back stairs to be boxed as shown.

Fit Butler's Pantry with iron sink; closet with cupboard below and shelves above. Fit up dumb-waiter. Closets in second floor to have one shelf in each, and hanging hooks.

Plumbing: — Furnish and set 4′ range in Kitchen; furnish and connect one 50-gallon copper boiler.

4′ 6″ copper bath-tub, and Jennings water-closet. Bath and closet to have ventilated traps; 4″ cast-iron soil-pipe carried full bore above roof and connected with sewer. Make proper connections with hot and cold supply, and furnish plated compression-cocks.

Lath and Plaster: — Lath all stud partitions with best 4′ cleft lath, well nailed and joints broken; ceilings with same. Plaster three coats on walls and ceilings. Run plaster cornices in Hall, Parlor and Dining-room.

Painting: — Paint all exterior wood-work three coats, best white-lead and oil, colored as may be directed. First floor of interior, four coats same; second floor, three coats.

All wood-work to be of clear white-pine, kiln-dried.

ESTIMATE FOR BUILDING IN THE NEIGHBORHOOD OF NEW YORK.

"AS YOU LIKE IT": —

Sir, — To build your house as per plans will cost about thirty-four hundred ($3,400) dollars. Yours, etc., J. C. MILLER, 239 West Fiftieth St., New York.

THE DECORATIVE TREATMENT OF METALS IN ARCHITECTURE. — II.

TAKING up the second portion of his subject, bronze, Mr. Birch remarked that this mixed metal had been known and made from the most remote antiquity — the Biblical chronology speaking of Tubal Cain, in the seventh generation from Adam, as the "instructor of every artificer" in "brass" and "iron." This led him to notice that in old English, whenever "brass" occurs we should read "bronze." Brass, the alloy of copper and zinc, was a comparatively modern metal, and had no permanency as a material, being easily corroded, whereas the compound of nine parts of copper to one of tin, which we now knew as bronze, was of the greatest antiquity, and was in itself almost imperishable. While we frequently found instruments of bronze side by side with worked flints of the neolithic period, it was singular that we did not find either copper or tin in their unmixed state — almost suggesting that these bronze implements must have been imported or procured from some race which were in advance of all others in civilization. These bronze celts, or lance and arrow heads, were not confined to any one country; from the boundless steppes of Asiatic Russia, through the whole of Europe, the northern shores of the sandy deserts of Africa, and the once densely populated plains of Asia, were these implements found differing but slightly in shape or make. In considering the architectural use of bronze, it should be noted that the Egyptians only sparingly introduced any metal-work, in consequence of the beauty of the materials in which they wrought. Bronze only seemed to have been used for doors, for small figures of the gods, altars, and other portable objects. Herodotus gave us a circumstantial account of Babylon, and spoke of the hundred gates of the city, of brass or bronze, which he described as being very massive and having hinges and frames of the same material. All the streets leading up from the Euphrates were also defended by smaller gates, a fact referred to by Isaiah in his prophecy concerning Darius. These gates were all of wood, strongly bound and clasped with bronze straps, richly ornamented with figures in relief. There were now in the vestibule to the Assyrian Gallery of the British Museum a pair of gates almost as fresh and perfect as when left by the workmen 2,750 years ago. The history of these was curious. About eight years since a grave-digger was at work in one of the mounds marking the site of Ballawat, and struck upon some fragments of bronze. He made off to Mossul, knowing the value that the Giaours set upon everything of the kind. A friend of Mr. Rassam's bought the fragments, and sent them to him in England. On being examined, they were found to be inscribed with the legends of the tribute of the Zurái and Zidunái, the Tyrians and Sidonians. This important discovery drew attention to the place where they were found, and after much labor, Mr. Rassam succeeded in unearthing the remains of the Temple of Imgur Bel, the Jupiter Belus of Herodotus, called by the Assyrians Nergal, the giant god of war. The inscribed foundation-stones gave the dedication of the temple, by Assur-nazirpal, the son of Tiglath-Adar, the son of Rimmon Nirari. Interesting as this discovery was, it was far surpassed by one on the opposite side of the mound. Here the laborers came upon an extraordinary mass of metal, seemingly involved in one huge Gordian knot of inextricable complication, crushed out of all shape, and corroded with oxidation. This discovery was followed almost immediately by another, and that again by remains of a third. They found their way to the British Museum, and by the almost superhuman toil and unwearying energy of Mr. Ready, they had resumed their ancient shape, and told us the story of Shalmanezar, the son of Assur-nazirpal, the builder of the temple, who carried his victories from the Euphrates to the shores of the great sea of the setting sun, and who received tribute from the Phœnicians, of silver and gold, tin and copper plates, and the teeth of the dolphin. By the courtesy of the Society of Biblical Archæology, the lecturer exhibited photographs of some of the most interesting scenes depicted on these hinges, including long processions of tributary nations bringing gifts. These gates were entirely of beaten bronze, the groups and figures being of repoussé work, arranged in parallel bands between borders decorated with small, rosette-like rivets at stated intervals. These bands not only passed completely round the cedar or piece-planking, but also round the immense posts which worked in sockets and caps of beaten metal. Each hinge was composed of two bands of repoussé figure-work about nine inches deep, each, and separated by a plain strip of metal. Each folding leaf of the door was about twenty-two feet high by seven feet wide, and there were seven bands on each door.

The Homeric period, which Mr. Birch regarded as contemporary with this palmy day of the Assyrian Empire, might be more properly termed the Bronze Age of Architecture, so universal was the use of this metal. The well-known Treasury or Tomb of Atreus at Mycenæ, was originally covered with plates of bronze, and many of the nails and a few plates were discovered among the débris, although most of the larger fragments have long disappeared in the repeated spoliations of the buildings. Dr. Schliemann considered that the faces of the lions on the gate were never carved, but were of gilt bronze-work added to the stone-work. The treasury at Orchomenos was decorated in a similar manner. The old story of Danaë "being imprisoned by her father in a brazen tower," pointed to a plated construction of a similar character, while Homer, in his "Odyssey," Pausanias, and Sophocles, alluded to brazen chambers, and we found the same universal use of bronze in Italy, carried to great perfection of workmanship and finish by the Etruscans. Unfortunately, beyond their tombs, we had no remains of this people; but from this source we had obtained many exquisite examples of vases, statues, and other works, copies of some of which the lecturer exhibited. Tertullian said that Rome was inundated by the immense quantity of bronze statues, over 2,000 in number, taken from the Volsinii, an Etruscan nation; and Camillus was accused of having sequestered for his own use some brass gates adorned with reliefs, part of the spoils of the conquered Ucii. Rome soon adopted a form of decoration of which it had until these conquests been entirely destitute; and later on, the Greek influence was apparent. With the Romans, as with us, art was fashionable, and what they did not plunder from other nations they imported and acquired like ordinary produce. With them, as with us, art was a good investment, and ministered to their pomp and vanity. The allusions to the use of bronze-gilt were very numerous, and the buildings themselves afforded ample confirmation of the descriptions. The Temple of Vesta, which is circular, had a dome covered with gilt bronze. The Pantheon retained its bronze gates; but the gilt-bronze plates which decorated the square coffers of its dome had all disappeared, some of it having been used by Urban VIII, (Barberini), to make the baldacchino over the high altar of St. Peter's, the lining of the Tomb of St. Peter, and bronze cannon for the castle of San Angelo. In the chapel of the Holy Sacrament in the Basilica of St. John Lateran were four bronze columns, said to have been brought from the temple of Jupiter Capitolinus, and to have originally been made from the bronze prows of the vessels captured at Actium. Close to the Forum were three remaining superb Corinthian columns of a temple which used to be called Jupiter Stator, but which had since been renamed.

The lecturer referred to the frequent introduction of bronze and marble into the Roman scenes depicted by Alma Tadema, with scholar-like knowledge and minuteness. Among the beautiful remains of wall-paintings discovered at Pompeii, there were some remarkable for the peculiar perspectives of architectural design, with columns and architraves of a singularly attenuated form. Mr. Fergusson, in his "History of Architecture," Vol. IV., chap. V., was inclined to believe that these paintings (copies of which the lecturer showed) represented a peculiar style of architecture, "which could only have come into fashion from the continual use of bronze," and said further that Vitruvius reprobated and Cassiodorus mentioned it. With regard to the first authority, the lecturer could find no passage which could warrant such an interpretation, and with regard to the latter, he had not, at present, found any mention at all. If such were the case, it was odd that not a single trace of such a style should be found amongst so many thousands of antiquities in metal which were constantly being discovered, and still more strange was it that at Pompeii and Herculaneum, where these paintings were common, not a single atom remained to bear out such a theory, while bedsteads, curule chairs, tripods, candelabra, and lamps abounded. The lecturer announced that in his next lecture he should deal with bronze in the Middle Ages, and the progress of the blacksmith's art, and in his closing address he should refer to the use and abuse of metal-work, and our failures and successes in the decorative treatment of the metals.

In his second Cantor lecture on this subject, delivered at the Society of Arts on Monday evening, Mr. Geo. H. Birch sketched the history of the use of bronze, from its decline after the fall of the Roman Empire and its gradual recovery of its old artistic position during the Middle Ages, to its culminating point at the time of the Renaissance, and then took up the early treatment and applications of iron. The platform was occupied by specimens of castings in bronze and iron lent by the Coalbrookdale Company, and on the walls of the room were hung a large number of pencil and ink drawings, photographs and lithographs of ornamental metal-work.

When the seat of government was transferred from Rome to Constantinople, the arts declined, the growth of the Christian religion not being favorable to their progress. There was an independent art at Constantinople for secular purpose, but it was only a faint reflex of what had been. Among its works were the column erected by Justinian in A.D. 543, which was covered with bronze plates, and surmounted by an equestrian statue of the emperor, thirty feet in height; there were also colossal statues of the Emperors Thedosius the Great (now at Barletta) and Zeno, and the famous horses now at St. Mark's, Venice, which have been taken from Africa to Europe, then to the far East, to Italy, to Paris, and finally back to Italy. Had

these horses been of any other material than bronze, they could not have survived such vicissitudes. Some of the most remarkable works which emanated from Constantinople were the doors of bronze enriched with inlays of silver, which decorated to this day some of the Italian churches. Thus St. Mark's, Venice, possesses one, brought from St. Sophia, at the same time as the bronze horses in 1204; and there are four others at the Duomo, Amalfi, San Salvadore di Bireto, Atrani, the Benedictine church at Monte Cassino, and the church at Monte Santangelo, all presented in the second half of the eleventh century by members of the Pantaleoni family. The five doors are similar in character, pointing to a common origin. All have the same stiff, Byzantine treatment of the figures and heads, represented by incising lines into the bronze and filling them with silver. They are ascribed to a Greek workman named Staurachios, Latinized into Staurontius, who flourished at Constantinople about 1050–72. In the Duomo of Salerno are five bronze doors, one containing silver inlays, given to the cathedral in 1099. The bronze doors of the basilica of St. Paul's-without-the-Walls, at Rome, unfortunately destroyed by fire in 1824, were of similar character; and in the former basilica of St. Peter were also bronze and silver doors, in which the precious metal must have been used more liberally than in the other examples, since the doors afforded seven thousand pounds of silver for plunder. At the cathedral at Ravello are some very fine doors of bronze, dated 1179, somewhat different in character from those previously referred to. These and the doors at Trani and Monreale are attributed to Barisianus, of Trani. Another twelfth-century worker in bronze was known as Oderisius, of Beneventura, who made the bronze doors and Troya, and probably those of the cathedral of his native place, which latter are adorned with Scriptural subjects and figures in relief of saints and bishops. These doors are traditionally said to have been made at Constantinople; but although betraying a marked Greek character, as early bronze work does universally both in Italy and Germany, they are more likely to be Italian work. Adjoining the church of San Sabino, at Canosa, is the tomb of Bohemondas, who died in 1102. It is of white bronze gates, covered with reliefs, arabesques, and inscriptions, the whole, like the adjacent church, partaking of a Saracenic character. The next series of these superb bronze gates, in which the work is freer as to the style and character, the relief much higher, and the tendency to Byzantine tradition much less marked, are the well-known gates of San Zeno, Verona, the Duomo at Pisa, San Clemente, Piscara, San Ambrogis, Milan, and the south doors of the baptistery of St. John's at Florence. The Verona example is by the brothers di Figarola, and is the earliest in date (1171); it is in two divisions, each sixteen feet high, and six feet three inches wide, and is divided into twenty-four panels by bands of pierced and chased work; the panels seem to represent a root of Jesse, but appear to have been misarranged. The south doors of the Duomo at Pisa, the work of Bounano, in 1180, are well known from the reproductions in the Architectural Court, South Kensington Museum. The doors at Monreale are attributed to the same artist, while those at the Baptistery of San Giovanni, Rome, are by Piero and Uberto di Piacenza.

The thirteenth century produced at Pisa several generations of artists in bronze, known as the Pisani. At Perugia there is a superb fountain of marble and bronze, from the hand of Giovanni di Pisa, and the south doors of the baptistery at Florence are by Giovanni's pupil, Andrea Pisano da Pontidera, the friend of Giotto. These doors marked an epoch in bronze casting, and prepared the way for his successor, Lorenzo Ghiberti; they represent scenes in the life of John the Baptist, and are dated 1330. The Renaissance of Art was now beginning to make itself felt, and in the first and last pairs of gates by Ghiberti we saw that influence progressing and approaching its zenith. These gates occupied the artist for twenty-eight years, from 1424 to 1452; the casts at the South Kensington have unfortunately been gilded. Very different in feeling are the central doors at St. Peter's, Rome, the combined work of Filareta and Simeone Donatello, 1431; in these, Scriptural history is mixed up with historical events in the life of the Pope, both cheek by jowl with Leda and the Swan, Ganymede and satyrs, nymphs and nudities. The bronze door of the Sacristy at St. Mark's, Venice, by Sansovini, is better; the subjects are the Entombment and Resurrection beautifully executed, but with an unpleasantly theatrical energy thrown into the smaller figures and heads. One of the richest churches in Italy in objects of art is the Holy House at Loretta, a building where bronze decoration can be studied to the greatest advantage, as it possesses some of the masterpieces from the hands of Girolamo Lombardo, Tiburzio Uerzelli, and others. Many of the public fountains of this period, in Italy, owe their chief merit to the way in which bronze has been introduced, as in Fontana del Giganti at Bologna, the combined work of Antonio Lupi and Giovanni di Bologna, those of Perugia, Pisa, Florence, and Rome, and the well-known bronze well in the *cortile* of the Ducal Palace at Venice.

Having referred to the bronze decorations on the tombs of the Medicis in Florence, Mr. Birch remarked that in no other country can bronze in connection with architecture be studied to such advantage as in Italy. The Italians during the Middle Ages and the Renaissance had a preference for this material, and combined it with marbles in so many ways, and with such unvarying success, that it almost seemed as if the arts and traditions of the ancient Etruscans had never completely died out. It was difficult to say why bronze was not extensively used among the other branches of the Latin family. In Spain there was very little, and that little late in character. Toledo and Seville each possessed, however, two bronze pulpits, and lofty screens of the same material shutting off the choir proper from the rest of the church. France was poor in bronze works, they being chiefly confined to a few isolated effigies in Amiens Cathedral, the Louvre, and some works executed for François I, by Cellini, Ponzio, and other Italian artists. The successors to these men, Goujon, Tremjin, Roussel, Cousin, and Pilon, only left a few portrait-busts in bronze, and during the reigns of Louis XIV, XV, and XVI, there was little done in France in this material beyond a few equestrian statues, and the decoration of the state apartments at Versailles. In the time of the First Napoleon the Vendôme Column, a travesty of Trajan's Pillar, and a few doors were executed; but of late years French sculptors had been turning attention to this beautiful material, and were producing very beautiful works of art, although the tendency was more towards small objects, than architectural decoration.

In the strict sequence of the history of bronze in Christian art, Germany ought to be placed next to Italy, as bronze decoration there actually preceded the employment of that metal in Italy. There could be little doubt that the prevalence of these bronze doors in the churches of Hildesheim, Mayence, Aix-la-Chapelle, Augsburg, and elsewhere, was due to the influence of Charlemagne and his successors. Constantinople was the fountain-head from which German sculptors derived their inspiration, although they invested their work with their own purely Teutonic spirit. Between the eighth and seventeenth centuries, Germany produced many works of art in bronze, and there seemed to have been several independent centres whence this art emanated. Several specimens of these works, including the well-known gates at Augsburg *c.* 1070, and the lion at Brunswick, which the lecturer regarded as purely Byzantine, might be studied from electrotypes in South Kensington; and besides gates and doors, there were some tabernacles and many fonts in this material. The later works in bronze, and some of the grandest ever executed in this material, were to be found chiefly at Nuremburg, the home of the Uischer family, who for three generations carried on this industry, and made some of the finest bronze tombs and shrines extant. One of the most curious uses to which the Germans applied bronze was that of letting into gravestones the device or coat of arms of the deceased. The cemetery of St. John, at Nuremburg, formerly possessed over three thousand of these, including that of Albert Dürer.

England, notwithstanding its isolated position, was not behindhand, although it could not show such a wonderful succession of bronze works of art as were to be found in Italy. The first applications of bronze in connection with architecture were to be seen at Salisbury Cathedral and Westminster Abbey; at the former building some of the abaci of the columns were in bronze, and at the latter the fillets connecting the Purbeck shafts to the central pier were of this material — a very curious and instructive example of its use. Waltham Abbey, Essex, was perhaps the earliest instance of the use of copper or bronze in this country. Harold's original church was said to have been adorned with plates of gilt metal, and in the deeply-incised spiral lines which decorated some of the pillars of the existing nave were still to be seen traces of their being filled in with metal, the rivets remaining. Our chief works in this material were the monumental effigies of our kings, principally at Westminster. These included Henry III, 1272; Eleanor of Castile, 1291, the work of William Torell; William of Valence, 1295, an effigy of copper plated over wood and enriched with enamels. Then in order came Edward III, a very fine work of art; Edward, the Black prince, at Canterbury; Richard II, and Anne of Bohemia, his Queen; and lastly the superb tombs of Henry VIII, and Elizabeth of York, 1509, and Henry's mother, Margaret, Countess of Richmond and Derby. These three last were the work of Torregiano, but the grille and the gates at the end of Henry VII's chapel were believed to be the work of two Englishmen—Humphray Walker, founder, and Nicholas Ewen, coppersmith and gilder. The large group of bronze in the courtyard of Somerset House, by Bacon, of George III and Old Father Thames, was perhaps one of the best, although one of the latest, before the art became utterly devoid of merit, and passed into heavy and lumpish representations of individuals of isolated interest. Brass was a useful and highly ornamental adjunct to internal architecture, but would not bear exposure to the weather.

THE PARIS WORKMAN. — The Paris *ouvrier* is no idler. He makes upon an average two hundred and fifty days in the year, the hours being ten in the summer and eight in the winter; forty-six per cent of the workmen in Paris make three hundred days in the year, besides overtime. They work by the hour in most trades, and earn from six to eight francs a day. About ten per cent do not work on Sunday, but even these make no objection when required to do so. The remainder do not regard Sunday, but take a holiday when convenient. The first Sunday in the month, however, being pay-day, is generally a holiday. Accidents in workshops are often met by a common assurance fund, to which masters and *ouvriers* equally subscribe. Many employers refuse a man unless he consents to this small tax on his work, which amounts to about one centime the hour, or two sous a day. It is reckoned to cost the employer about fifteen francs a year for each man. In case of accidents which are curable the injured man receives two francs fifty centimes a day; if he has lost a member, a pension of three hundred francs a year; and if killed, his widow or family receives a sum of seven thousand francs. — *Good Words.*

NOTES AND CLIPPINGS.

The Responsibility of Common-Carriers.— A somewhat interesting lawsuit was recently tried at Antwerp, a glass manufacturer having sued the Belgian Railway for having delivered a case with the contents broken. The company, it appears, declined to pay the damage, claiming that according to their regulations the package must bear external evidences of injury in order to establish their responsibility. The tribunal, however, decided that the State, being under such circumstances a carrier that receives goods in proper condition, and is paid for conveying the same, must deliver them in an equally proper condition, and the fact that the party to whom the goods were sent having made no remark when the goods were delivered does not by any means diminish the railway company's responsibility.— *The Iron Age.*

The Farnesina Palace. — The Farnesina Palace at Rome, famous for the "Galatea" and the frescoes of the story of Cupid and Psyche, by Raphael, was lately opened again to the public after having been closed for some years, the occasion being the tercentenary of the birth of Raphael, on the 28th of March. The committee charged with this celebration applied to the Duca di Ripaida, who occupies the palace as life-tenant for the King of Naples, to open it on the anniversary; and the Duke not only consented to this, but has further announced that, as the cracks in the walls have not widened, he will open it to the public as before. Every one in Rome knows the story about its being closed, and to a great extent sympathizes with its owner. The municipality sequestered all his garden for the Tiber-Embankment scheme; and where was once a garden filled with oranges and bay-trees, the most picturesque bit on the river, is now a waste of works, filled with pools of stagnant water after rain. The excavations were pushed so near the palace that the foundations were loosened, and the walls covered with priceless frescoes cracked, and showed signs of giving way. The Duke protested and sued for damages, but got no satisfaction; and then in a fit of anger and spite shut up the palace; and as people resented this as hiding what had come to be looked on as a national show, he affixed a notice to the doors claiming it to be "foreign property." It must be remembered that it belongs to the ex-King of Naples. —*St. James's Gazette.*

The Use of Sand as a Filling-in Substance. — Attention has recently been given in Germany to the hygienic dangers arising from certain substances being used for the filling-in underneath flooring. Herr Lieblein, of Frankfürt, has called attention to the fact that dry sand forms a most suitable filling substance from all points of view. He remarks that the greater weight of this substance than that of others in common use does not form any real obstacle to its introduction, inasmuch as beams of solid construction are quite capable of supporting the weight, and none others should, under any circumstances, be used. In Frankfürt, it would seem that the use of sand as a filling material has been general for many years. In writing on the subject to the *Deutsche Bauzeitung,* Herr Lieblein also refers to the question of flooring-boards being placed sufficiently closely together for the penetration of moisture to be effectually prevented. He specially advocates the use of pitch-pine for this purpose, on account of its hardness and resinous properties, and records the fact that his application of that wood to the purpose indicated has proved successful in many instances, while its cost is, he maintains, but little in excess of that of other kinds of flooring. Another German technical paper has called attention to the advantages of using deal flooring-sleepers impregnated with creosote in place of oak ones. Durability and freedom from rot are ascribed to this kind of sleepers. It is said they do not spread any smell of creosote in the rooms in connection with which they are used. They are spoken of as being specially applicable to the lower parts of houses built in damp situations, or in which damp has manifested itself. — *The Builder.*

An Engineering Accident.— Dr. William Wallace, the Glasgow City analyst, has recounted the story of a very serious but instructive accident, which took place near Alloa. In the construction of a railway bridge over the Forth, a number of cylinders were sunk into the bed of the river. They were built of iron rings six feet in diameter and several feet high, and made a total height of sixty feet. The space round the sections was filled up from the inside by a rusting composition, of iron turnings mixed with sulphur and sal ammoniac. When wetted, this mixture oxidizes and swells up, so as to fill the spaces into which it is thrust. It was applied to the joints by one man. One day last May, however, when there was a perfectly still, somewhat hazy atmosphere, and considerable heat without direct sunshine, this man was observed to become overpowered by some "mysterious influence," and a companion descended by a windlass to bring him up to the top of the cylinder. He managed to get the man into the bucket of the windlass, and so to get him hauled up into purer air; but the deliverer himself succumbed to the same influence, and falling into a pool of water at the bottom of the cylinder was unfortunately drowned. One of the contractors now descended, taking care, however, to fasten a rope to his body, and it was fortunate he did so, as he also succumbed and had to be pulled out by the rope. Dr. Wallace was called in to account for this fatal accident and traced it to the absorption of oxygen by the rusting compound, thus depriving the air in the cylinder of its sustaining power. The oxygen combined with the iron and sulphur of the mixture, and the state of the atmosphere prevented free circulation of fresh air into the cylinder. The result was that the gas breathed by the man was nitrogen, or air robbed of its oxygen. The normal proportion of that gas in the air is 20.9 or 21 per cent, and Dr. Angus Smith has shown that this proportion cannot be altered, even by one-fourth per cent without producing appreciable effects, while a loss of one-half per cent gives rise to serious inconvenience, and air containing only twenty per cent of oxygen may produce grave consequences if breathed for a considerable time. When the deficiency of oxygen exceeds this to a sensible extent a candle refuses to burn, and a man exposed to it soon becomes insensible. Dr. Wallace's interesting conclusion is worthy the attention of engineers in general. — *Engineering.*

Mediæval Sculpture. — During the Middle Ages sculpture had had its reason, its vital possibility, its something to influence it — nay, to keep it alive — in architecture; but with the disappearance of Gothic building disappears also the possibility of the sculpture which covers the portals of Chartres and the belfry of Florence. The pseudo-classic colonnades, entablatures, all the thin bastard Ionic and Corinthian of Alberti and Bramante did not require sculpture, or had its own little supply of unfleshed ox-skulls, green-grocer's garlands, scallopings, and wave-linings, which, with a stray siren and one or two bloated emperors' heads, amply sufficed. On the other hand, mediæval civilization and Christian dogma did not encourage the production of naked or draped ideal statues like those which antiquity stuck on countless temple-fronts, and erected at every corner of square, street or garden. The people of the Middle Ages were too grievously ill-grown, distorted, hideous, to be otherwise than indecent in nudity; they may have had an instinct of the kind, and, ugly as they knew themselves to be, they must yet have found in forms like those of Verrocchio's David insufficient beauty to give much pleasure. Besides, if the Middle Ages had left no moral room for ideal sculpture once freed from the service of architecture, they had still less provided it with a physical place. Such things could not be set up in churches, and only a very moderate number of statues could be wanted as open-air monuments in the narrow space of a still Gothic city, and, in fact, ideal heroic statues of the early Renaissance are fortunately not only ugly, but comparatively few in number. There remained, therefore, for sculpture, unless contented to dwindle down into brass and gold miniature-work, no regular employment save that connected with sepulchral monuments. During the real Middle Ages and in the still Gothic north, the ornamentation of a tomb belonged to architecture, from the superb miniature minsters, pillared, and pinnacled and sculptured, cathedrals within the cathedral, to the humbler foliated arched canopy, protecting a simple sarcophagus at the corner of many a Lombard Street. The sculptor's work was but the low relief on the church flags, the timidly-carved, outlined, cross-legged knight or praying priest, flattened down on his pillow as if ashamed of even that amount of prominence, and in a hurry to be trodden down and obliterated into a few ghostly outlines. But to this humiliated, prostrate image, to this flat thing doomed to obliteration, came the sculptor of the Renaissance, and bade the wafer-like simulacrum fill up, expand, raise itself, lift itself on its elbow, arise and take possession of the bed of state, the catafalque raised high above the crowd, draped with brocade, carved with rich devices of leaves and beasts and heraldry, roofed over with a daïs, which is almost a triumphal arch, garlanded with fruits and flowers, upon which the illustrious dead were shown to the people, but made eternal and of eternal magnificence by the stone-cutter, and guarded, not for an hour by the liveried pages or chanting monks, but by winged genii for all eternity.— *Cornhill Magazine.*

The Berlin Elevated Road.— A correspondent of the San Francisco *Chronicle* writes that the city of Berlin, Germany, has just opened an elevated railroad around the city that does away with all the objections of the New York roads. The correspondent, after referring to the objectionable features of the New York roads says: The Berlin elevated —"*Staatbahn*" they call it — is an entirely different sort of affair. In the first place, it does not spoil any more streets than is absolutely necessary. It cuts across lots, so to speak, going wherever it sees fit and taking the shortest way of getting there; and, as it belongs to the Government, it does not hesitate to buy and remove buildings which stand in its way. The result is that it does not thrust itself almost into the front windows of the people along the streets, but goes stealing along through their back yards, and crossing streets on great iron bridges, thus allowing foot-passengers a chance to live without being in constant terror of their lives every time they happen to pass near it; nor is it noisy and dirty, like its New York relative. Its roar is much more subdued and musical, and, what is much better, is not broken by any sharp rattling, but is continuous, like the hum of a huge bee, and it "holds over" the New York contrivance in the matter of stations as much as is possible. Instead of the common open sheds and cheerless waiting-rooms in which the New Yorker waits for his train, the Berliner has immense iron and glass stations, into which the trains run to take up their waiting passengers. Nor does the dissimilarity between the systems stop here. The shaky, homely, disfiguring, inconvenient and seemingly dangerous scaffolding upon which the happy New Yorkers are whirled from one end of their city to the other would not be allowed in Berlin. In its stead we find a solid, substantial structure of brick, stone and concrete, some twenty feet in height and as many broad, supporting upon its great arches, not a single narrow-gauge track, but two tracks of the standard European gauge, together with all the varied and complicated signal apparatus, which, puzzling though it may be to a novice, is an indispensable attachment to all European roads. The people do not seem to be restive because they are deprived of the New York pleasures of having their clothes spoiled by drops of grease or dirty water, or of having cinders — some of them hot — slip down the backs of their necks from the passing train.

An Electric Underground Railway in London.— The underground electric railway, whose construction has been authorized by act of Parliament, will commence near the north end of Northumberland Avenue, opposite the Grand Hotel, and pass under that avenue and the Victoria Embankment to a tunnel under the Thames, thence by College Street and Vine Street to Waterloo Station, where it will form a connection with the platforms of the London and Southwestern Railway. A separate approach to the Waterloo terminus of the line will, however, be built at York Road. The line will be double, and worked by a stationary engine at Waterloo. The cars will run singly, and start as soon as filled, like omnibus cars. The journey will occupy about three and one-half minutes. A contract for the supply of the electrical plant has been entered into with Messrs. Siemens Brothers, and a tender for the construction of the permanent way in eighteen months' time has also been accepted. Part of the work—about sixty feet of arching under the Embankment—has already been built.— *Scientific American.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

SUMMARY OF THE WEEK.

Baltimore.

RESTAURANT AND STORE. — C. E. Cassell, architect, has prepared plans for a two-st'y brick restaurant and store, 38' x 90', to be built at 91 West Fayette St.

BUILDING PERMITS. — Since our last report thirty-seven permits have been granted, the more important of which are the following: —

John W. Garrett, two-st'y brick building, in rear of No. 77 Monument St., between Cathedral and Park Sts.

Firemen's Insurance Co., seven-st'y brick and stone building, n e cor. Second and South Sts.

David Wilfson, four-st'y brick warehouse, 28' x 112', s w cor. Cross St. and Clement Alley.

H. Hartman, three-st'y brick building, s s Baltimore St., between Carrollton Ave. and Stockton Alley.

Posner Bros., 2 two-st'y brick buildings, e s State St., between Saratoga and Mulberry Sts.

V. J. Shemick, three-st'y brick building, n w cor. Broadway and Barnes Sts.

Church of Holy Martyrs, three-st'y brick parsonage, e s Mount St., s of Lombard St.

Wm. J. Kirk, two-st'y brick building, s s Walnut Alley, between Ross and Pear Alleys.

Wm. H. Russell, 2 two-st'y brick buildings, e s Ringold St., between McHenry and Ramsay Sts.

Geo. W. Green, three-st'y brick building, n w cor. Bond St. and Callender Alley.

L. M. Carrick, 2 two-st'y brick buildings, on Twenty-foot Alley, between Edmondson and Franklin Sts. and Mount and Fulton Sts.

F. W. Garrettson, two-st'y brick stable in alley rear of Arlington Ave., between Harlem Ave. and Lanvale St.

M. Widekend & Co., 2 brick-kilns, on lot w s Mire Bank Lane, between Eager and Chew Sts.

Lewis Dohme, five-st'y brick warehouse, s s Pratt St., between Howard and Entaw Sts.

J. M. Getz, 5 three-st'y brick buildings, s s Biddle St., between Getz Ave. and Ensor St.

P. D. Burgan, three-st'y brick building, s w cor. Harford Ave. and Preston St.

S. D. Price, 7 two-st'y brick buildings, e s Washington St., n of Biddle St.

Mary F. Bayne, three-st'y brick building, w s Collington Ave., between Pratt and Gough Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Unnamed St.*, from H St., No. 47, Ward 14, for Henry Souther, 3 dwells., 18' x 28', two-st'y flat; Wm. T. Eaton, builder.

Newbury St., No. 314, Ward 11, for Stephen E. Westcott, dwell., 30' x 80', two-st'y flat; G. W. Pope, builder.

Centre St., cor. Thomas St., Ward 23, for Geo. P. Trott, stable, 28' x 33', one-st'y mansard.

Depot Sq., cor. Green St., Ward 23, for Thomas P. Proctor, tenement and store, 51' x 86' 9", four-st'y flat; Wm. A. Stearns, builder.

Wood. — *P St.*, cor. East Sixth St., Ward 14, for Lydia W. Lincoln, store, 8' x 20', one-st'y flat; Wm. N. Henderson, builder.

Gold St., Nos. 175-179, Ward 13, for Henry G. Dennie, storage, 36' x 60', one-st'y pitch; N. S. Smith, builder.

I St., No. 108, Ward 14, for Lyman Locke, dwell., 30' x 58', three-st'y flat; Lyman Locke, builder.

Gilbert St., rear of, near Hoffman St., Ward 23, for Miss Anna M. Hall, stable, 10' x 16, one-st'y pitch; Robert D. Ward, builder.

Rostin Ave., near Albano St., Ward 33, for Wm. G. Becker, stable, 25' x 35', two-st'y flat; Wm. G. Becker, builder.

Washington Ave., cor. Hyde St., Ward 15, for Estate Patrick O'Brien, currying-shop, 50' x 90', four-st'y flat; James G. Brennan, builder.

Border St., opposite Falcon St., Ward 1, storage of lumber, 28' x 90', one-st'y flat; Chas. E. Ricker, builder.

Rutherford Ave., nearly opposite Miller St., for J. H. Pote & Co., wagon-house, 22' x 150, one-st'y pitch; Chas. Erskine, builder.

Market St., near Washington St., Ward 25, for Cattle Fair Hotel Corporation, stable, 32' x 70' and 34' x 34', one-st'y pitch; J. W. Berry, builder.

River View St., near Adams St., Ward 24, for Wm. H. Fuller, 2 dwells., 19' x 27', two-st'y pitch; James Pope, builder.

Lauriat Ave., near Norfolk St., Ward 24, for Geo. W. Goodale, dwell., 22' x 31' and 14' x 18', two-st'y pitch.

Hampden St., rear No. 72, Ward 20, for Aaron D. Williams, storage; Frank Barthel, builder.

Elm St., near Ashley Ave., Ward 1, for John Young, dwell., 24' x 30', two-st'y hip; John Young, builder.

West Ninth St., No. 137, Ward 15, for James Lilly, dwell., 21' 6" x 32', three-st'y flat; Patrick F. Hanlon, builder.

Greenwich Pl., near Commercial St., Ward 24, for Timothy Hallahan, dwell., 20' x 28', two-st'y pitch; Edward Porter, builder.

Allston St., rear of, near Sharp St., Ward 24, for Noyes Bros., carpenter-shop, 20' x 24', one-st'y pitch; Noyes Bros., builders.

Brooklyn.

HOUSES. — Six three-st'y and basement houses, 16' 6" x 52', to be built of brick, with stone and terra-cotta finish, are to be built on St. James Place, for Mr. Thos. S. Thorp, from designs of Mr. Alfred H. Thorp, of New York.

BUILDING PERMITS. — *Dean St., No.* 911, near Classon Ave., three-st'y frame double tenement, tin roof; cost, $3,500; owner and builder, Thomas Donnelly, 1089 Pacific St.; architect, I. D. Reynolds.

Van Dyke St., n s, 100' w Van Brunt St., four-st'y frame double tenement, tin roof; cost, $6,000; owner, H. Niemetz, Van Dyke St., cor. Van Brunt St.; architect, T. Liebbrand; builders, P. Kelly & Son and Gibrson & Liebbrand.

Second St., No. 299, w s, 60' from North Second St., three-st'y brick building, tin roof; cost, $4,500; owner, Christian Manneschmidt, 297 Second St.; architect, A. Herbert; builders, G. Lehrian & Sons, carpenter not selected.

De Kalb Ave., s s, 66' w Elliott Pl., 4 four-st'y brownstone front tenements, gravel roofs; cost, each, $6,000; owner, G. W. Brown, 728 Fulton St.; builder, L. E. Brown.

Eagle St., No. 190, s s, between Manhattan Ave. and Oakland Ave., three-st'y frame double tenement, gravel roof; cost, $4,000; owner, Thomas Helley, on premises; architect, J. Mulhaul; builders, J. Hutford and Randall & Miller.

Flushing Ave., s w cor. Hamburgh Ave., three-st'y frame store and double tenement, tin roof; cost, $4,500; owner and builder, George Loeffler, 82 Tompkins Ave.; architect, T. Engelhardt.

Maujer St., No. 166, s s, 100' e Graham Ave., three-st'y frame double tenement, tin roof; cost, $4,000; owner, George Binder, on premises; architect, T. Engelhardt; builder, P. Kuntzweiler.

Bleecker St., s s, 125' w Evergreen Ave., two-st'y frame dwell., tin roof; cost, $3,000; owner, Charles Singer, Greene Ave., near Bushwick Ave.; architect and builder, J. Philipps.

Ellery St., No. 181, n s, 96' e Delmonico Pl., three-st'y frame store and double tenement; tin roof; cost, $4,000; owner, Wm. Kolb, 189 Hopkins St.; architect, T. Engelhardt; builders, M. Kuhn and J. Rueger.

Quincy St., s s, 100' w Tompkins Ave., 5 two-st'y brownstone front dwells., gravel roofs; cost, each, $5,500; owner and builder, James W. Stuart, 952 Lafayette Ave.; architect, F. Weber.

Berkeley Pl., s s, 100' e Seventh Ave., 3 three-st'y brownstone front dwells., tin roofs; cost, each, $10,000; owner and builder, E. B. Sturges, 135 De Kalb Ave.; architect, A. Hill.

Park Ave., n e cor. Marcy Ave., three-st'y frame store and double tenement, tin roof; cost, $5,000; owner, Fred Miller, Hart St., cor. Lewis Ave.; architect, T. Engelhardt; mason, W. Rauth.

Willoughby Ave., s s, 277' 4" e Nostrand Ave., three-st'y brick dwell., tin roof; cost, $8,500; owner, John F. Saddington, 189 Penn St.; architect and builder, T. B. Saddington.

Willoughby Ave., e s, 200' e Nostrand Ave., 4 two-st'y brick dwells., tin roofs; cost, each, $6,000; owner, etc., same as last.

Greene Ave., s e cor. Nostrand Ave., 6 four-st'y brownstone front tenements, gravel roofs; cost, each, $10,000; owner, Michael Rawl, 115 Harrison St.; architects, Parfitt Bros.; builder, G. B. Dearing.

Sterling Pl., s s, 100' w Sixth Ave., 6 three-st'y brownstone front dwells., gravel roofs; cost, each, $8,000; owner, Henry Lansdell, Ninth St., cor. Fifth Ave.; architect, C. B. Sheldon.

Leonard St., Nos. 579 *and* 581, w s, 200' n Nassau Ave., 2 three-st'y frame tenements, gravel roofs; cost, total, $9,500; owners, John Affleck, 92 India St., and Annie M. Stalkers, 634 Leonard St.; builders, J. A. T. Varmper and T. Kepple.

Seventeenth St., n s, 300' e Fifth Ave., 5 three-st'y frame tenements, tin roofs; cost, each, $2,500; owner, E. F. Hermans, 256 Prospect Ave.; architect and builder, G. Herman.

Montrose Ave., No. 208, s s, 125' e Humboldt St., two-st'y brick tenement, tin roof; cost, $4,600; owner, John Freese, 204 Montrose Ave.; architect, T. Engelhardt; builders, W. Dafeldecker and Thoma & Wade.

Lawrence St., No. 117', e s, 100' n Willoughby St., three-st'y brick store and dwell., tin roof; cost, $8,000; owner, Frederick Aldridge, 24 Myrtle Ave.; architect, J. Mumford; builders, J. H. Stevenson, and Morris & Selover.

Moore St., n s, 100' w Graham Ave., 4 four-st'y frame tenements, tin or gravel roofs; cost, each, $7,000; owners, architects and builders, Bush & Wandell, 16 Court St., Room 93.

Wall St., No. 22, s s, 200' e Broadway, two-st'y frame tenement, tin roof; cost, $3,000; owner, Catherine Herrschaft, 776 Broadway; architect, T. Engelhardt; builder, J. Sedelmeyer.

Hooper St., n s, 150' w Lee Ave., 4 two-st'y brownstone front dwells., tin roofs, iron cornice; cost, each, $5,000; owner, Geo. F. Simpson, Rodney St., cor. Kent Ave.; architect, E. F. Gaylor.

Jefferson St., s s, 340' e Nostrand Ave., 4 three-st'y brownstone front dwells., tin roofs; cost, each, $8,500; owner, Hermon Phillips, 289 Jefferson St.; architect, J. G. Prague.

Jefferson St., n s, 420' e Nostrand Ave., 4 three-st'y brownstone front dwells., tin roofs; cost, each, $8,500; owner, etc., same as last.

Chicago.

HOUSES. — Burnham & Root, architects, are preparing plans for a house in Champaign, Ill., for Mr. A. C. Burnham, of pressed-brick and stone, to cost $25,000.

The same architects are drawing plans for five houses for Mr. Holbrook, of Evanston, brick and slate.

George Spohr, architect, has plans ready for dwelling-house on Frederick St., Lake View, two-st'y basement and attic, 30' x 60', for Mr. G. C. Koch, to cost $10,000.

George Spohr also reports plans for 2 three-st'y dwells., to be built on West Adams St., for Capt. Long, 48' x 56', to cost $8,000; also, house, two-st'y, 22' x 60', for Dr. Anderson, to cost $5,500.

J. W. Ackermann, architect, has the following on hand: —

House for P. O'Callaghan, at Lake View, two-st'y, stone finish, slate roof, 27' x 60'; cost, $6,000.

Two houses, two-st'y, 31' x 47', octagon fronts, cut-stone finish, pressed-brick, terra-cotta ornamentation, for G. W. Manning, to be built cor. of Drexel Boulevard and Forty-second St.

STORES. — George Spohr reports a three-st'y and basement store, 25' x 60', for Henry Karstens, on Wells St., near Division St., to cost 8,000.

BUILDING PERMITS. — S. S. Greely, three-st'y brick dwell., 30' x 42', 56 Bellevue Place; cost, $7,000.

Chas. F. Foerster, two-st'y brick dwell., 40' x 60', 524 Hubbard St.; cost, $8,500.

F. Baragwanath, two-st'y basement shop and dwell., 24' x 56', 1253 Milwaukee Ave.; cost, $4,000.

C. Lasman, four-st'y brick store and dwell., 25' x 80', 416 Halsted St.; cost, $6,500.

L. C. Kuhnert, 2 four-st'y brick store and dwells., 50' x 80', 418 and 420 Halsted St.; cost, $13,000.

H. B. Sortman, 4 two-st'y brick dwells., 38' x 80', 323-329 Loomis St.; cost, $8,000.

Chicago Board of Education, three-st'y basement brick school-house, 86' x 117', Leavitt St., cor. Lexington St.; cost, $80,000.

Edwin Day, 2 two-st'y brick dwells., 40' x 58', Groveland Park; cost, $10,000.

Mr. Palmer, two-st'y basement and attic brick dwell., 30' x 60', 2829 Prairie Ave.; cost, $12,000.

Jas. Houska, two-st'y brick dwell., 20' x 20', 113 Brown St.; cost, $3,000.

John Mountain, three-st'y brick flats, 25' x 70', 269 Superior St.; cost, $8,000.

Wm. Griffiths, three-st'y brick flats, 22' x 64', 598 North Clark St.; cost, $7,000.

J. H. Swan, two-st'y basement and attic brick dwell., 43' x 79', 2623 Michigan Ave.; cost, $30,000.

Wm. Schatt, two-st'y brick dwell., 21' x 70', 772 North Robey St.; cost, $3,000.

A. Neumann, two-st'y brick dwell., 21' x 93', 201 Burling St.; cost, $5,000.

G. Hafemeister, two-st'y cellar brick dwell., 21' x 68', 43 Bissell St.; cost, $3,500.

Chas. Badel, two-st'y cellar brick dwell., 21' x 68', 45 Bissell St.; cost, $3,500.

Wm. Farrar, three-st'y basement brick dwell., 25' x 70', 2343 Michigan Ave.; cost, $7,000.

G. Franks, three-st'y brick building, 48' x 55', 682-684 Indiana St.; cost, $12,000.

H. C. Brown, two-st'y basement brick dwell., 22' x 54', Belden St.; cost, $4,000.

J. C. Anderson, two-st'y brick dwell., 30' x 32', Polk St., near Ogden Ave.; cost, $3,000.

Tobias Samuelson, three-st'y brick flats, 49' x 50', Centre Ave.; cost, $10,000.

H. Holt, two-st'y brick dwell., 20' x 70', 406 Noble St.; cost, $3,500.

H. Schroeder, two-st'y brick dwell., 20' x 70', 235 North Ashland Ave.; cost, $3,000.

G. K. Lathrop, two-st'y brick flats, 22' x 45', Webster St.; cost, $2,600.

Mrs. C. K. Beckett, two-st'y brick dwell., 22' x 62', 3640 Indiana Ave.; cost, $3,000.

M. O. Connell, two-st'y brick flats, 21' x 60', 300 West Fourteenth St.; cost, $3,000.

Abel Jones, two-st'y brick dwell., 22' x 52', 461 Warren Ave.; cost, $3,000.

Frank O. Kerr, two-st'y basement brick dwell., 22' x 80', 700 Noble St.; cost, $5,000.

Wm. Hoyt & Co., five-st'y basement brick store, 28' x 55', 11 Michigan Ave.; cost, $5,000.

Cincinnati.

BUILDING PERMITS. — F. D. Jones, three-st'y brick store, n s of Fifth Ave., near Vine St.; cost, $10,000.

Mrs. E. Lankwork, three-st'y brick dwell., 295 West Ninth St.; cost, $4,000.

J. Armbruster, three-st'y brick dwell., Queen City Ave.; cost, $5,000.

Belmont & Overbeck, two-st'y brick building, cor. Hatch St. and Observatory Road; cost, $5,000.

J. B. Deiters, three-st'y brick building, 666 Sycamore St.; cost, $4,500.

Turner Hall Co., new club-house, Everett St. near Wade St.; cost, $30,000; Samuel Hannaford, architect; cost, $30,000.

Stephen Gibson, two-st'y frame dwell., Park Ave., near Warsaw Pike; cost, $2,500.

Dr. E. Freeman, two-st'y frame building, Lane St., near Locust St.; cost, $4,000.

Chas. Cahn, two-st'y brick dwell., Oliver St., near Linn St.; cost, $5,000.

L. B. Gibson, three-st'y brick building, s w cor. Seventh and Main Sts.; cost, $4,000.

Mrs. A. Behrls, two-st'y frame building, Butler St., near Third St.; cost, $3,000.

John McKona, repair two-st'y brick building, 101 Gest St.; cost, $3,000.

Ten permits for repairs; cost, $5,000.

Total permits to date, 370.

Total cost to date, $1,356,600.

New York.

ASYLUM. — The laying of the corner-stone of the new Hebrew Asylum on Tenth Ave., between One Hundred and Thirty-sixth and One Hundred and Thirty-eighth St., took place on Wednesday, May 16. The new asylum, with its grounds, will cost $600,000.

BACHELOR APARTMENT-HOUSES are quite in vogue, and two residences are to be changed for such purposes. No. 5 East Seventeenth St. is to be altered from designs of Mr. James Stroud, at an expense of about $20,000, for the heirs of Dr. Sands. No. 43 West Thirty-sixth St. is to be altered from designs of Mr. B. Silliman, at an expense of about $15,000.

CHURCHES. — The Rev. W. P. Flannelly, pastor of St. Cecilia's Roman Catholic Church, in East One Hundred and Fifth St., has filed plans for a brick and terra-cotta church, to be erected on the south side of One Hundred and Sixth St.; cost, $80,000.

A church for colored Catholics will be built shortly.

NEW BUILDINGS. — The principal buildings now being torn down, preparatory to new work, on Broadway, are at the corner of Liberty St., for the Williamsburg City Fire Insurance Co., F. Carlos Merry, architect; the corner of Ninth St., as mentioned above; the corner of Seventeenth St., for the Parrish Estate, D. Lienan & Son, architects; the corner of Nineteenth St., for the Goelets, Ed. H. Kendall, architect, and the corner of Thirty-third St., for Hyde & Behman's Theatre, J. Sexton, architect.

OFFICE-BUILDING. — Alfred Pell, the manager for the Commercial Union Assurance Company, of London, has filed plans for a six-st'y office-building at No. 46 Pine St., at a cost of $74,000.

STORE. — For Sailors' Snug Harbor, a store, 23′ on Broadway, and 122′ on Ninth St., is to be built from designs of Messrs. Wm. Field & Son.

THEATRE. — The "Star" Theatre is to be improved internally for Mr. Lester Wallack, from designs of Messrs. Holman Smith & Kelley.

BUILDING PERMITS. — *Broadway, No.* 771, n w cor. Ninth St., six-st'y brick and iron front store, tin roof; cost, $100,000; owners, Trustees of Sailors' Snug Harbor, Room 33, Nos. 74 and 76 Wall St.; architects, Wm. Field & Son.

Washington St., cor. Fulton, West and Vesey Sts., one-st'y iron market-building, gravel, tin, slate and glass roof; cost, $225,000; owner, City of New York; architect, Douglas Smyth.

West Tenth St., Nos. 170 *and* 172, five-st'y brick and stone flat, tin roof; cost, $50,000; owner, Mary E. Cole, 463 West Seventy-third St.; architect, Alf. H. Thorp; builders, Samuel Lowden and Grissler & Fausel.

East Fifty-ninth St., Nos. 110 *and* 112, three-st'y brick club-house, tin roof; cost, $90,000; owners, Progress Club, 127 East Fifty-ninth St.; architect, Emile Gruwe; builders, Chr. Eberspacher and R. Westbrook, Myers & Co.

Eighth Ave., n w cor. Eighty-sixth St., a frame grand stand, felt roof; cost, $3,000; lessees, Manhattan Athletic Club; architects and builders, R. P. Tomassek & Co.

Eightieth St., s s, 100′ w Fourth Ave., five-st'y brick and stone dwell., slate and tin roof; cost, $35,000; owner, Sigmund Oppenheimer, 241 East Eighteenth St.; architect, Leopold Eidlitz; builders, Van Dolsen & Arnott and Thos. Wilson.

Eightieth St., s s, 125′ w Fourth Ave., five-st'y brick and stone dwell., slate and tin roof; cost, $28,000; owner, Isidor Kaufman, 105 East Eightieth St.; architect and builders, same as last.

Fourth Ave., n w cor. One Hundred and Twenty-fourth St., 4 four-st'y brick and stone tenements and stores, tin roofs, cost, each, $12,000; owner, Chas. Welde, 327 East One Hundred and Twenty-third St.; architects, Babcock & McAvoy.

Frankfort St., Nos. 55 *and* 57, six-and-a-half-st'y brick store, tin roof; cost, $35,000; owners, Barnes & Merritt, 97 Gold St.; architect, Jno. McIntyre; builders, Robinson & Wallace and Wm. J. O'Connor.

Seaman Ave., n s, 233′ e Bolton Road, Twelfth Ward, two-st'y frame dwell., slate and tin roof; cost, $6,000; owner, Isaac M. Dyckman, Kingsbridge; architect and builder, S. L. Berrian.

Fifty-seventh St., n w cor. Seventh Ave., ten-st'y and attic (rear part of building fifteen-st'y) brick and stone front flat; slate and brick roof; cost, $650,000; owner, Thos. Osborne, 1753 Ave. A; architect, J. E. Ware.

Lexington Ave., s w cor. One Hundred and Twelfth St., four-st'y brick flat, tin roof; cost, $16,000; owner, Warren P. Tompkins, 598 East One Hundred and Thirty-fourth St.; architect, Arthur Arctander.

West St., Nos. 164 *and* 165, five-st'y brick store, tin roof; cost, $17,972; owner, Wm. R. Renwick, 112 East Eighteenth St.; architect, Geo. M. Huss; builders, G. M. Platt and H. M. Smith.

Forty-second St.; n s, to Forty-third St., 185′ e First Ave., two-st'y brick stable and a lumber storage-shed; cost, $8,500; lessee, Chas. H. Wilson, Mount Vernon, New York; architects and builders, Chas. Graham & Sons.

East One Hundred and Fourteenth St., No. 317, five-st'y brick tenement, tin roof; cost, $18,000; owner and builder, Wm. Fernschild, 324 East Eleventh St.; architect, Geo. Fernschild.

One Hundred and Sixth St., n e, 175′ w First Ave., 7 four-st'y brick tenements, tin roofs; cost, each, $13,000; owner, Wilhelmine Juch, 351 East One Hundred and Fourth St.; architect, Arthur Arctander.

One Hundred and Fourteenth St., No. 345, four-st'y brick tenement, tin roof; cost, $10,000; owners and builders; Barker & Smith, New Rochelle, N. Y.; architect, Alf Chamberlain.

Broadway, n e cor. One Hundred and Thirty-second St., 4 four-st'y brick tenements and stores, tin roofs; cost, each, $10,000; owner, Geo. M. Groves, 64 West Fifty-fourth St.; architect, J. F. Burrows; builders, A. D. Edwards and Pritchard Knox.

West Twenty-eighth St., No. 225, five-st'y front brick factory, plastic slate roof; owners and builders, Cary & Moen, 224 West Twenty-ninth St.; architect, E. O. Lindsey.

West Forty-sixth St., No. 418, five-st'y brick tenement, tin roof; cost, $17,000; owner, Henry Doescher, 424 West Forty-sixth St.; architect, J. M. Forster.

Ludlow St., No. 23, five-st'y brick tenement, tin roof; cost, $11,000; owner, Harris Baum, 1449 Third Ave.; architect, Wm. Graul.

Fifty-sixth St., n s, 335′ w Eighth Ave., seven-st'y brick flat, tin roof; cost, $75,000; owner, James A. Frame, 105 East Seventieth St.; architects, Thom & Wilson; done by days' work.

Minnetta St., No. 9, five-st'y brick tenement, tin roof; cost, $9,000; owner, Emeline Johnston, 445 East Eighty-fourth St.; architect, A. B. Ogden.

Macdougal St., No. 101, five-st'y brick tenement, tin roof; cost, $11,000; owner and architect, same as last.

Second Ave., n e cor. One Hundred and Eighteenth St., five-st'y brick tenement and store, tin roof; cost, $18,000; owner and builder, Jos. E. McCormack, No. 1 Lincoln Pl.; architect, M. V. B. Ferdon.

Second Ave., e s, 27′ n One Hundred and Eighteenth St., five-st'y brick tenement and store, tin roof; cost, $16,000; owner, builder and architect, same as last.

Second Ave., e s, 53′ n One Hundred and Eighteenth St., five-st'y brick tenement and store, tin roof; cost, $16,000; owner, builder and architect, same as last.

One Hundred and Eighteenth St., n s, 80′ e Second Ave., four-st'y brick tenement, tin roof; cost, $14,000; owner, builder and architect, same as last.

Ave. A, w s, 78′ 1″ s Ninetieth St., one-st'y brick boiler-house, brick arched roof; cost, $6,000; owners, Managers of St. Joseph Orphan Asylum, Jos. Helmprecht, President, 173 East Third St.; architect, A. H. Blankenstein; builder, not selected.

First Ave., w s, 75′ s Eighty-first St., 2 five-st'y brownstone front tenements and stores, tin roofs; cost, each, $22,500; owners, Emeline and Elizabeth Johnston, 443 and 445 East Eighty-fourth St.; architect, A. B. Ogden.

Eighty-ninth St., n s, 81′ w Lexington Ave., 5 four-st'y brownstone front flats, tin roofs; cost, each, $20,000; owner, Dennis Looney, 224 East One Hundred and Sixteenth St.; architect, Eugene Parker.

Ninetieth St., s s, 81′ w Lexington Ave., 8 four-st'y brownstone front flats, tin roofs; cost, each, $20,000; owner and architect same as last.

ALTERATIONS. — The German Leise Verein Club-House, No. 641 Lexington Ave., is to be altered and extended from designs of Messrs. D. & J. Jardine.

The alterations to Booth's Theatre have commenced. They will cost not less than $200,000; Mr. Ed. H. Kendall is the architect.

Park Pl., s w cor. Church St., internal alterations; cost, $10,000; owner, Metropolitan Life Insurance Co., on premises; architects, N. Le Brun & Son; builders, J. C. Lyons and Smith & Bell.

East Twenty-fifth St., Nos. 413 *and* 415, repair damage by fire; cost, $3,000; owner, Chas. Wagner, 327 East Sixty-fifth St.; builders, C. W. Klappert's Sons.

Broadway, s e cor. Twenty-third St., raise three stories; cost, $50,000; owner, Jeannette P. Goin, 4 East Twenty-third St.; architects, Price & Freeman; builder, H. Wilson.

West Thirty-eighth St., No. 234, front part of building raised one st'y and internal alterations; cost, $5,000; owner, Barbara Seitz, 332 East Forty-second St.; architect, Joseph M. Dunn.

East Thirty-seventh St., No. 26, internal alterations; cost, $18,000; owner, Chas. Lanier, 30 East Thirty-seventh St.; architect, Carl Pfeiffer; builder, Geo. Mulligan.

Third St., No. 7, four-st'y brick extension and internal alterations; cost, $20,000; owner, the No. 7 East Thirty-second St. Co., 35 West Thirtieth St.; architects, D. & J. Jardine.

East Twenty-fifth St., No. 243, raise one st'y; cost, $5,000; owner, Sophia Sterns, 120 West Eleventh St.; architect, Thos. F. Houghton.

West Thirty-sixth St., No. 61, four-st'y brick extension, internal alterations, and front remodelled; cost, $8,000; owner, Francis Hitchcock, 61 West Thirty-sixth St.; architects, McKim, Mead & White; builder, J. C. Miller.

Jacob St., Nos. 5, 7 *and* 9, four-st'y brick extension; cost, $5,000; owner, David Moffatt, 71 Willow St., Brooklyn; architect, J. C. Cady & Co.; builders, W. & T. Lamb, Jr.

West Forty-seventh St., No. 4, one-st'y brick extension; cost, $3,000; owners, Meeker & Hedden, 15 Cortlandt St.; builder, Jos. Richardson.

Broadway, Nos. 279, 281 *and* 283, repair damages by fire; cost, $4,000; owner, estate of Mary A. S. Carter; architect, John W. A. Ritch; builders, John A. O'Connor & Co.

Reade St., No. 57, repair damage by fire; cost, $5,500; owner, Estate of Mary A. S. Carter; architect, John W. Ritch; builders, Holmes Bros.

East Eighty-sixth St., No. 218, raise one st'y, rebuild part of front wall, and a four-st'y brick extension; cost, $6,500; owner, Alexander Buderus, 307 East Seventy-third St.; architect, John Brandt.

First Ave., n w cor. Fifty-fifth St., two-st'y brick extension; cost, $7,500; owner, Rev. J. J. Flood, Fifty-fifth St., near First Ave.; architect, Arthur Crooks; builders, List & Lennon and Jas. Thompson.

East Twenty-first St., No. 217, raise 3 feet, new flat roof, and a three-st'y brick extension, rebuild front wall; cost, $3,000; owner, Peter Schneider, 185 Canal St.; architect, Wm. Kuhles.

Fourth Ave., No. 114, raise attic to full story and new flat roof, and a one-st'y brick extension; cost, $3,580; owner, Henry Bernard, 34 East Fifty-seventh St.; architect, J. W. Marshall; builder, John E. O'Brien.

Canal St., Nos. 86 *to* 92, raise one-st'y and front altered; cost, $15,000; owner, S. D. Babcock, 636 Fifth Ave.; architect, Richard Berger; builders, Wm. G. Slade and Henry Powers.

Fifth Ave., No. 434, *No.* 1 *West Thirty-eighth St., and No.* 2 *West Thirty-ninth St.*, five-st'y brick extension, also internal alterations; cost, $15,000; owner and exr., Josiah H. Burton, Newburg; architects, D. & J. Jardine.

Wall St., No. 49, interior alterations; cost, $8,000; owner, United States Trust Company, on premises; architect, Henry Dudley; builders, Frank Lyons and Chas. E. Hadden.

Union Sq., No. 4, front altered and interior alterations; cost, $8,000; lessees, Schmitt & Fuhrman, on premises; architect, Chas. Wagner; builder not selected.

Second Ave., Nos. 884 *and* 886, two-st'y brick extension; cost, $6,500; owners, H. Clausen & Son, 309 East Forty-seventh St.; builders, J. & L. Weber.

Third Ave., No. 2029, move building back 40 feet to rear, raise attic to full story, new flat roof, and a one-st'y brick extension; cost, $4,000; owners, Leopold and Felix Metzgar, Second Ave., cor. Fifty-fifth St.; architect, Julius Boekell.

Dover St., s e cor. Pearl St., raise mansard st'y; cost, $15,000; owner, Richard K. Fox, One Hundred and Twenty-ninth St.; architect, John Rogers, 115 Nassau St.

East Thirty-fourth St., No. 221, *and rear of Nos.* 223 *and* 225 *East Thirty-fourth St.*, three-st'y brick extension; cost, $5,000; owner, N. Y. Condensed Milk Co., 79 Murray St.; architect, Richard Berger; builder, J. S. Smith.

Philadelphia.

BUILDING PERMITS. — *Tahassa St., No.* 908, two-st'y dwell., 15′ x 41′; E. C. Sheppard, contractor.

Thirty-second St., e s, n of Wharton St., 4 two-st'y dwells., 15′ x 28′; A. Wilson, owner.

North Sixth St., No. 435, two-st'y addition to hall, 40′ x 90′; Chas. Beitenmiller, contractor.

Thirty-first St., e s, bet. Thompson and Master Sts., two-st'y storage building, 26′ x 80′; Paul J. Essex, contractor.

Wilder St., n s, bet. Nineteenth and Twentieth Sts., 5 two-st'y dwells., 15′ x 49′; M. B. Stackhouse, owner.

Preston St., No. 815, three-st'y dwell., 17′ x 56′; Jno. Wilson, contractor.

Preston St., e s, n of Oregon St., three-st'y dwell., 18′ x 56′; Jno. Wilson, contractor.

Frankford Road, s of Allegheny Ave., two-st'y dwell., 17′ x 53′; McNutt & Haddock, contractors.

Van Pelt St., No. 2008, two-st'y dwell., 14′ x 42′; J. A. Ruhl, owner.

Queen St., bet. Philadelphia and Reading R. R. and Ridge Ave., 3 three-st'y dwells., 16′ x 43′; Chas. Bartle, contractor.

Germantown Ave., s w cor. Oxford St., three-st'y dwell., 20′ x 36′; Jno. Kramer, contractor.

Wildey St., No. 324, five-st'y store and dwell., 20′ x 51′; L. Schwab.

Mascher St., Nos. 1416 *and* 1418, 2 three-st'y dwells., 16′ x 32′; Jno. Eichel.

North Fifth St., No. 2604, three-st'y dwell., 20′ x 45′; Andrew Hernberger.

Chelten St., cor. Magnolia Sts., four-st'y picker-house, 39′ x 46′; T. W. Wright & Son, contractors.

Federal St., No. 1225 (rear of), two-st'y stable, 17′ x 60′; Thompson Bros.

Wynkoop St., n s, w of Thirteenth St., three-st'y stable, 19′ x 70′; and two-st'y stable, 17′ x 70′; Robertson & Bryan, contractors.

Connarroe St., s e s, bet. Ridge Ave. and Mitchell St., three-st'y dwell., 17′ x 32′; Chas. M. Horner, contractor.

Garden St., n e cor. Jenks St., two-st'y dwell., 17′ x 40′; A. W. Linn, contractor.

Twenty-seventh St., s w cor. Cambridge St., 12 two-st'y dwells., 14′ x 35′; R. M. McClellan, owner.

Clarion St., above Federal St., two-st'y dwell., 16′ x 32′; W. E. May, owner.

Germantown Ave., No. 2706, three-st'y dwell., 17′ 6″ x 44′; Oliver Ottinger, owner.

Elm St., No. 3515, three-st'y dwell., 14′ x 38′; J. B. Elliott, contractor.

Locust St., s of and e of Juniper St., three-st'y dwell., 20′ x 90′; S. H. Tont, contractor.

Hancock St., bet. Coulter and Mill Sts., 6 three-st'y dwells., 15′ x 53′; Jas. Kurwear & Sons, contractors.

Scotts Lane, cor. Crawford St. (Falls of Schuylkill), 4 two-st'y dwells., 16′ x 40′; Benj. Walker.

Township Line and Clapier St., two-st'y stable, 30′ x 36′; Martin Hetzel.

Memphis St., bet. York and Emlen Sts., 4 two-st'y dwells., 14′ x 42′; Chas. Bosser, contractor.

Second St., cor. Huntington St., four-st'y factory, 121′ x 180′; Robertson & Bryan, contractors.

Sixteenth St., w s, s of Allegheny Ave., two-st'y stable, 25′ x 30′; R. J. Whiteside & Son, contractors.

Sixth St., w s, bet. Wharton and Reed Sts., 5 three-st'y dwells., 16′ x 48′; A. M. Greene, owner.

Barlow St., w s, bet. Wharton and Reed Sts., 4 two-st'y dwells., 15′ x 30′; A. M. Greene, owner.

Brown St., No. 336, three-st'y store-house, 14′ x 30′; Chas. O. Kronglowicz, contractor.

Eveline St., e of Frederick St., 2 three-st'y dwells., 15′ x 32′; C. C. Lenneban, contractor.

Martha St., w s, n of Huntington St., two-st'y dwell., 15′ x 30′; Bernard McSloy, owner.

Otis St., e s, n of Richmond St., two-st'y store and dwell., 18′ x 28′; J. Graham & Son, contractors.

Orthodox St., s s, w of Leiper St., 2 three-st'y dwells., 18′ x 59′; Wm. Milner, contractor.

Second St., e s, n of Trenton R. R., three-st'y factory, 74′ x 130′; J. A. Riter & Co., contractors.

Barclay St., s s, w of Sixth St., two-st'y dwell., 18′ x 30′; Jno. Maylin, contractor.

Emerald St., e of Venango St., 4 two-st'y dwells., 13′ x 28′; Geo. Gillback, owner.

Twenty-first St., w s, s of Reed St., 4 dwells., 16′ x 28′; Wm. Forbes.

Christian St., n s, bet. Broad and Fifteenth Sts., three-st'y dwell., 18′ x 65′; Thompson & Brother.

Cadwallader St., e s, bet. Montgomery and Columbia Aves., five-st'y addition to hat factory, 34′ x 42′; Jno. B. Stetson, owner.

James St., s s, 129′ e of Pratt St., 2 two-st'y dwells., 14′ x 42′; R. C. Taylor, owner.

Hamilton St., s s, w of Fifteenth St., one-st'y hide salting building, 36′ x 95′; Francis Black, contractor.

Alter St., n s, bet. Twentieth and Twenty-first Sts., one-st'y foundry, 58′ x 84′; T. H. Doan, contractor.

Weise St., n of Mill St., two-st'y dwell., 15′ x 32′; Abraham Mather, owner.

Forty-sixth St., n e cor. Oregon St., 5 two-st'y dwells., 16′ x 30′; Rheinhardt & Danseiser, owners.

North Front St., No. 132, four-st'y warehouse, 25′ x 43′; Thos. Little, contractor.

Coulter St., bet. Main and Hancock Sts., two-st'y dwell., 25′ x 35′; H. A. Buzby, contractor.

Allegheny Ave., s e cor. Emerald St., three-st'y factory and boiler-house, 54′ x 154′; S. R. Stewart, contractor.

St. Louis.

STRIKE. — The Stone-Cutters' and Plasterers' Associations in this city having instigated a strike there is an excellent opening just now for competent and steady men in both trades, not under control of the unions, to find prompt and permanent employment with the leading contractors.

STORE. — The Turner Real Estate and Building Association are building a large six-st'y store on Eighth St., between Olive and Locust Sts.; the building to have 64′ front and 127′ deep; Peabody & Stearns, of Boston, are the architects; and P. P. Furber, superintendant; Norcross Brothers, builders.

BUILDING PERMITS. — G. Gundlang, two-st'y brick addition to store; cost, $3,000; W. C. Popp, contractor.

R. F. Miller, two-st'y brick store and dwell.; cost, $3,000; R. F. Miller, contractor.

Wm. Schroeder, two-st'y brick dwell.; cost, $7,500; G. W. Pipe, architect; Bothe & Rathemann, contractors.

Sam Owens, two-st'y brick dwell.; cost, $2,600; J. Riddle, contractor.

Dr. G. W. Vogt, two-st'y brick dwell.; cost, $4,500; Mortimer, architect; William Kerpsieck, contractor.

Mrs. Dimmock, four-st'y brick store building; cost, $11,500; G. I. Barnett, architect; E. Illsley, Sr., contractor.

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THE city of New York is in danger of losing the services of another public officer, who, like the Inspector of Buildings, has shown himself too sincere and energetic in the execution of what he regarded as his duty to suit the taste of that singular body of persons which administers the affairs of the largest community on the continent. After some fifteen years of untiring and intelligent devotion to the public good, in various ways, Professor Charles F. Chandler, the President of the Board of Health, has been rejected by the Aldermen of the city as a candidate for reappointment. No reason is assigned for this action. Professor Chandler was renominated by the Mayor as a matter of course, and his selection was applauded, so far as can be discovered, by every respectable citizen; but his administration of his office has no doubt already made a sufficient inroad upon the profits of the business which flourishes most amid filth and misery to alarm the ruling class, and compel the removal of a person of such unpleasant activity. Fortunately for the people of the city, their other vigilant and skilful guardian, the Inspector of Buildings, is somewhat protected against the attacks of those who make money out of suffering, by the law under which his office is constituted, which makes him an appointee of the Fire Commissioners, instead of the Aldermen. Those who wish, for their private purposes, to get him out of the way are obliged to adopt a roundabout way of doing it, and seem to have hit upon the idea of driving him to distraction by ceaseless quarrels, anxieties, ingratitude and misrepresentation, as the quickest method of getting rid of him. It is to be regretted that the daily papers, in their eagerness after new scandals, unintentionally allow themselves in this way to be made the tools of designing persons, to torment and distress by the publication of the most absurd articles, an official whose unflinching zeal for the good of his fellow-citizens would naturally make him the more sensible of that appreciation which they owe to him in return.

AMONG the more recent of the foolish stories regarding the Inspector is one which was published in the *Commercial Advertiser* not long ago. In this he was charged with being a victim to the "fire-escape mania;" and the assertion was made that he had ordered escape-ladders to be placed on fire-proof buildings; and that his object in insisting upon fire-escapes on street fronts was "seemingly the attainment of a uniformity of ugliness," with much other matter equally unfounded and ridiculous. It appears to us that the editor of an influential newspaper might exercise some discretion about giving currency to such silly attacks upon a faithful public servant; or might at least nullify their effect by a few words of common-sense; but that seems to be too much to expect of New York journalism, and the Inspector, in default of other defenders, is obliged to say a few words in his own behalf, which he does in a well-written letter. To the accusation that he has caused escape-ladders to be placed on fire-proof buildings he replies by a request, which is of course unanswerable, that some example of such indiscretion should be mentioned; and the assertion that the beauty of fine façades is spoiled by iron ladders is met by the concise and incontrovertible statement that such things are not ordered by the Department for any building so long as other methods are available for securing the safety of its occupants in case of fire; but that if the choice has to be made between risking human life and putting on outside fire-escapes, the Department conceives the latter to be the lesser evil. There is a certain meaning in the way in which the letter adds that "it is a mistake to suppose that fire-escapes must be ugly in appearance to be approved by the Inspector," and some of our younger architects might do worse than take the hint, and try to make something out of a motive which they will have ample occasion to deal with. After all, as the Inspector says, it is faulty planning which makes fire-escapes necessary; and if his strict enforcement of the law should lead to a demand for some improvement in the dull and brainless design common to a certain class of structures in our cities, the architects will have no reason to regret it; while generations of the future theatre-goers, hotel guests and working men and women of New York will have reason to bless the memory of the Inspector of Buildings who had the "fire-escape mania."

THE last annual meeting of the Archæological Institute of America, held in Boston a week or two ago, seems to have been unusually interesting and well attended, several members having made the journey from New York to be present. Much as the Institute has done in the way of archæological research, it would seem that the greatest difficulty which its officers experience is found in the necessity for choosing, among the many tempting opportunities offered for increasing the stock of the world's knowledge, the one which promises the best results in return for the very limited sums which the Institute can devote to it. For the present season, the modest amount of four thousand dollars is needed to complete the explorations at Assos, which have proved so successful, and a small farther sum is asked for, to pay for printing the report of Mr. Bandelier's expedition among the almost unknown Indian tribes of Mexico. There can be little doubt that the money for these purposes will be easily raised, and it is impossible not to wish that ten or twelve times as much might be added to it, for the sake of beginning farther investigations at once. The remarkable results which have been obtained at Assos with the smallest possible outlay, by the judicious and self-sacrificing labor of Messrs. Clarke and Bacon and their assistants, might, it would seem, be perhaps surpassed if the same energetic and skilful explorers could be retained in the service of the Institute, and transferred to a new field.

A RATHER singular case in relation to a party-wall has just been decided in Cincinnati, the decision covering very much the same ground as one or two recently made in Massachusetts. It seems that about fifty years ago a block of three brick stores was built in that city, divided by party-walls. The original builder sold the whole block to a syndicate of three persons, who afterwards divided the property among themselves, each taking one store. The division between the estates was described in the deeds as being the centre line of the partition wall, but no other agreement in regard to the wall seems to have been made. The estates have passed through several hands, and the present owner of one of them recently undertook to improve it by reconstructing all the walls, but was stopped by an injunction of court, forbidding any interference whatever with the party-walls, on the ground that they could not be removed without mutual consent. The hearing was on a motion to dissolve the injunction, which was granted, the judge holding that the universal practice in matters of party-walls permitted either owner to rebuild them, with or without the consent of the other, who, as the judge said, had certainly no right to prevent his neighbor from using his property as he might think best.

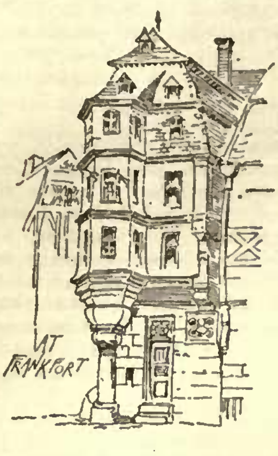
A MOVEMENT has been recently begun in France for the instruction of the poorer class of children in the theory as well as the practice of the industrial arts. For some years the associations of the various trades have maintained apprentices' schools, which have been, and still continue to be of great use, but the subject has now assumed sufficient importance to attract the attention of the Government, and a work has been undertaken which will be followed with interest by the friends and promoters of the similar movement now well under way in our own country. The first step taken under the direction of the French Government was the appointment of two commissions, one charged with the duty of inquiring into the conditions under which manual exercises could best be introduced into the primary schools of Paris, and the other with that of examining and reporting upon the existing apprentices' schools, as well as of investigating the practicability of establishing similar ones under the supervision of the public officers. The former of these seems to have completed its labors some time ago, and instruction in manual work already forms a part of the primary school course. The second commission, although its investigations were completed, and its report presented, in 1881, has only just had the satisfaction of seeing its recommendations carried into effect.

AS in every civilized country, the skill of workmen in the various industrial arts of France has within the last hundred years steadily declined. The cause of the decline is unquestionably to be found in the multiplication of labor-saving machines, and the division of labor, which have together reduced men to the condition of automata, each doing his unvarying task without thought; but the remedy for it is not so easily discovered. That some remedy is needed can hardly be denied, for, however profitable it may be to manufacturers of a certain class to have their work done by semi-animate machines instead of human beings, it is certainly an injury to the latter to pass their lives almost without mental effort; while industry in general suffers in the end by the discouragement of that quick-witted comprehension of the relation of means to ends which has hitherto done so much for the development of the arts in France. The most certain cure, in the opinion of the Commission, for the mental sluggishness to which the present system leads, is to be sought in the elevation of the standard of technical acquirement among the great body of workmen, not only by means of a systematic training of the eye and hand which should lead to the highest manual expertness, but by instruction in principles, which may serve to open the minds of pupils to a better comprehension of their future work, and will have the farther advantage of rendering them less helpless in case of those struggles between employers and employed which are now so disastrous to both. For the purpose of putting in practice on a suitable scale the ideas upon which the members unanimously agree, the Commission makes a recommendation that a school should first be established for the purpose of teaching the building trades, in which the arts of stone-cutting, framing, carving in stone and wood, joinery, roofing, casting, forging and fine metal-work, painting and glazing, might all be taught together, to the same pupils, who would thus gain the advantage which the Commission desires to secure in their future practice of any particular one of the correlated arts; while they would be fortified for the contingencies which their subsequent life might have in store by their more extended experience, as well as their increased mental capacity. Besides this special school for boys the Commission advises the establishment of a school for girls, in which some of the industries best fitted to their sex should be taught, at the same time with the great feminine art of housekeeping, which, as is wisely observed, the daughters of poor families, hurried into manufactories as soon as they are capable of earning anything, seldom have the opportunity of acquiring. There is something particularly pleasant in the thoughtfulness with which this important point is dwelt upon, and the means which the Commission suggests for securing the advantages of tuition to the very poorest children shows the same sympathy with their feelings and needs. Experience shows that young persons in such schools, after a year's training has given them a certain degree of manual dexterity, and fitted them to earn something by their labor, are then very often taken away, and placed in factories, where they can gain a few francs a week for their family. It would be hard to forbid this practice, detrimental as it is to the interests of the children, and the Commission proposes to prevent it by paying the pupils, after they have become proficient enough to be worth a salary elsewhere, something like what they would receive in the factories which compete with the school for them; furnishing, for example, a daily dinner to all pupils of a year's standing, and to those who have spent two years in the school a weekly salary in addition. Whether this last recommendation is to be carried out or not we do not know, but the suggestions of the Commission in regard to the establishment of the building school for boys, and the industrial and housekeeping school for girls, have been adopted, and the necessary steps have been taken for putting them in execution on an immense scale.

EXPERTS in hydraulic works are now agreed that the plan of cutting away the banks in the hope of straightening the course of a river is an unnatural and costly expedient, which should be resorted to only in case of pressing necessity, and at the best offers only a small hope of success; while, besides the inevitable lowering of the water-level in the upper reservoir, it is sure to entail the risk of injury to navigation in the sharper curves, as well as of disastrous accidents through floods, or by the action of ice, not only to the new dikes, but to the natural banks, denuded of their protection. The inexperienced engineer is apt to be misled by the apparent advantages of a rectilinear course, which seems at first sight the simplest, and best adapted to the needs both of navigators and riparian proprietors; yet all experience shows that such a course is practically objectionable. To restrain the current in a straight channel is almost impossible. The banks and bottom of the stream are never firm enough to be wholly unaffected by the action of the water, and are usually subject to alteration from the slightest cause. The deposition of silt soon gives some curvature to the bed, and the power of the current, increasing as the curvature adds a centrifugal force to its movement, tends more and more to cut away the concave side. This is, in some respects, advantageous to navigation, while the defence of the banks is rendered more effective by fortifying the concave sides. Moreover, the effect of floods in a crooked channel is less felt, and is less dangerous to the country lying near, than in a straight stream. The knowledge of all this has led, in Germany, to the promulgation of an order recommending that the "canalization," to which streams are continually subjected in that country, should be done with a view to preserving the natural curves as far as possible. To prevent still farther the obstruction of the natural course of the water by the undermining and collapse of artificial embankments, it is common there, even for small streams, to use the mattress revetting first employed, if we are not mistaken, on our Mississippi. The mattresses, made of twigs or fascines, strongly bound together, sink gradually, if the current should wash the earth out from beneath them, accommodating themselves to the new slope of the bank, instead of precipitating themselves in a heap into the water, and it is possible even to load and defend them with masses of stone, without lessening their valuable properties.

AN electrical railway is nearly ready for operation in New Jersey, where trials have been made with a view to employing motors as a substitute for horses in propelling the cars of the Newark and Bloomfield street-railway. So far, the cars have been run only on a small experimental track, but within a few weeks it is intended to place them on the main line. The motors used are constructed by the Daft Electric Company and present the peculiarity of employing a current of very low tension, so that there is no difficulty in insulating it, and the rails may be used as conductors without much fear of loss of power. The other chief objection to the use of the rails as conductors, that animals crossing the track would be exposed to great danger, is also removed by the low tension of the current, as a man can form a connection with his hands between the electrified rails without inconvenience, and almost without sensation, although the current is so strong that a copper or platinum wire placed in the same position is instantly burned up. The cost of operating the line by electricity is estimated at about one-third that of using horse-power, and although for a time some annoyance may be experienced from mischievous boys, who, by short-circuiting the current with a crow-bar laid across the tracks can stop all the cars, the officers of the company believe that this amusement will soon lose its novelty, and interference will cease.

FLITCH-PLATE, RIVETED AND TRUSSED GIRDERS.



IN forming floors where the common floor-joists rest on girders, two conditions are especially to be considered: First, that the supports of the girders shall be as few and far apart as possible, and second, that the girders shall have as little depth as possible.

Where wooden girders are used, the depth is practically limited to 14 inches; a 12″ x 14″ hard-pine timber being the largest size ordinarily used for a single beam. The breadth of the beam can be increased to any extent by placing two or more timbers side by side, but it is not generally economical or practicable to use a wooden girder larger than 14″ x 18″. Taking the weight of the floor and its greatest load at 125 pounds per square foot (the lowest limit for public buildings and factories, and too small for large warehouses), a 12″ x 14″ hard-pine girder of 25-foot span should not be placed more than 7′ 4″ on centres, nor should the span be increased beyond 25 feet, even though the beams be placed nearer together, as the deflection would be too great. Hence, if we wish to employ wooden girders, and desire a greater span or a greater distance between girders, we must employ some method of strengthening the timber. There are two ways in which it is found practicable to strengthen wooden girders — one is to bolt a plate of iron the full depth of the beam between two wooden beams, thus making what is called a flitch-plate girder; and the other is to truss the beam either with belly-rods or struts and rods, thus making what is called a trussed beam. Beams trussed in these ways differ from a truss proper, in that the wooden beam is in one piece, while a truss is supposed to be made up of different pieces united at points called joints.

FLITCH-PLATE GIRDERS.

In framing large buildings it often occurs that the floors must be supported upon girders which themselves rest upon columns, and it is required that the columns shall be spaced farther apart than would be allowable if simple wooden girders were used. In such cases the flitch-plate girder may be used, oftentimes with advantage. A section and elevation of a flitch-plate girder is shown in Figure 1.

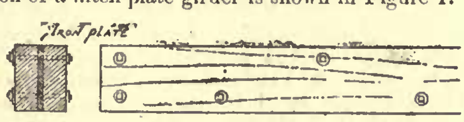


Fig. 1.

The different pieces are bolted together every two feet by ¾″ bolts, as shown in elevation.

It has been found in practice that the thickness of the iron plate should be about one-twelfth of the whole thickness of the beam, or the thickness of the wood should be eleven times the thickness of the iron. As the elasticity of iron is so much greater than that of wood, we must proportion the load on the wood so that it shall bend the same amount as the iron plate, otherwise the whole strain might be thrown on the iron plate. The modulus of elasticity of wrought-iron is about thirteen times that of hard-pine, or a beam of hard-pine one inch wide would bend thirteen times as much as a plate of iron of the same size under the same load. Hence, if we want the hard-pine beam to bend the same as the iron plate, we must put only one-thirteenth as much load on it. If the wooden beam is eleven times as thick as the iron one, we should put eleven-thirteenths of its safe load on it, or what amounts to the same thing, use a constant only eleven-thirteenths of the strength of the wood. On this basis the following formulæ have been made up for the strength of flitch-plate girders, in which the thickness of iron is one-twelfth of the breadth of the beam, approximately: —

Let $D =$ depth of beam.
$B =$ total thickness of wood.
$L =$ clear span in feet.
$t =$ thickness of iron plate.
$f = \begin{cases} 100 \text{ lbs. for hard-pine.} \\ 73 \text{ lbs. for hard spruce.} \end{cases}$
$W =$ total load on girder.

Then safe load at centre in lbs. $= \frac{D^2}{L} (fB + 720\,t)$. (1.)

Safe distributed load in lbs. $= \frac{2D^2}{L} (fB + 750\,t)$. (2.)

For distributed load, $D = \sqrt{\frac{WL}{2fB + 1500\,t}}$. (3.)

For load at centre, $D = \sqrt{\frac{WL}{fB + 750\,t}}$. (4.)

As an example of the use of this kind of girder we will take the case of a railway station in which the second story is devoted to offices, and where we must use girders to support the second floor of 25-foot span, and not less than 12 feet on centres if we can avoid it. This would give us to be supported by the girder a floor area of 12′ x 25′ = 300 square feet, and allowing 105 pounds per square foot as the weight of the superimposed load and of the floor itself, we have 31500 pounds as the load to be supported by the girder. Now we find by computation that if we were to use a solid girder of hard-pine it would require a 14″ x 17″ beam. If we were to use an iron beam we find that a 15″ heavy iron beam would not have the requisite strength for this span, and that we would be obliged to use two 12″ beams.

We will now see what size of flitch-plate girder we would require, should we decide to use such a girder. We will assume the breadth of both beams to be 12″, so that we can use two 6″ timbers, which we will have hard-pine. The thickness of the iron will be 1⅛″. Then substituting in Formula 3, we have

$D = \sqrt{\frac{31500 \times 25}{2 \times 100 \times 12 \times 1500 \times 1\frac{1}{8}}} = \sqrt{192} = 14''$. Hence we shall require a 12″ x 14″ girder.

Now for a comparison of the cost of the three girders we have considered in this example: the 14″ x 17″ hard-pine girder would contain 515 feet, board measure, which at five cents a foot would amount to $25.75. Two 12-inch iron beams 25 feet 8 inches long will weigh 2,083 pounds, and at four cents a pound they would cost $83.32. The flitch-plate girder would contain 364 feet, board measure, which would cost $18.20. The iron plate would weigh 1,312½ pounds, which would cost $52.50, making the total cost of the girder $70.70, or $13 less than the iron beams, and $45 more than the solid hard-pine beams.

Flitch-plate beams also possess the advantage that the wood almost entirely protects the iron, so that in case of a fire the heat would not probably affect the iron until the wooden beams were badly burned.

TRUSSED BEAMS.

Whenever we wish to support a floor upon girders, having a span of more than 30 feet, we must use either a trussed girder, a riveted iron-plate girder, or two or more iron beams. The cheapest and most convenient way is probably to use a large wooden girder and truss it, either as in Figures 2 and 4, or Figures 3 and 5.

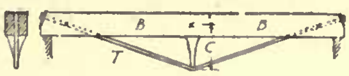


Fig. 2.

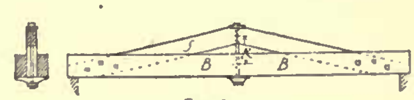


Fig. 3.

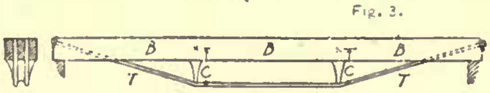


Fig. 4.

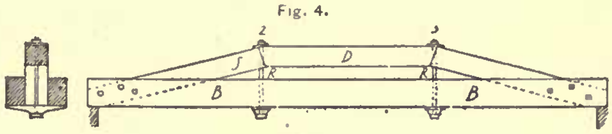


Fig. 5.

In the belly-rod truss, we either have two beams, and one rod, which runs up between them, at the ends, or three beams, and two rods running up between the beams in the same way. The beams if should be in one continuous length for the whole span of the girder they can be obtained of that length. The requisite dimensions of the tie-rod, struts, and beam in any given case must be determined by first finding the stresses which come upon these pieces, and then the area of cross-section required to resist these stresses. For a single-strut belly-rod truss such as is represented by Figure 2, the strain upon the pieces may be obtained by the following formulæ:

For distributed load W over whole girder: —

Tension in $T = \frac{3}{16} W \times \frac{\text{length of } T}{\text{length of } C}$. (5.)

Compression in $C = \frac{5}{8} W$.

Compression in $B = \frac{3}{16} W \times \frac{\text{length of } B}{\text{length of } C}$. (6.)

For concentrated load W over C: —

Tension in $T = \frac{W}{2} \times \frac{\text{length of } T}{\text{length of } C}$. (7.)

Compression in $C = W$.

Compression in $B = \frac{W}{2} \times \frac{\text{length of } B}{\text{length of } C}$. (8.)

For girder trussed as represented in Figure 3, under a distributed load W over whole girder: —

Compression in $S = \frac{3}{16} W \times \frac{\text{length of } S}{\text{length of } C}$. (9.)

Tension in $R = \frac{5}{8} W$.

Tension in $B = \frac{3}{16} W \times \frac{\text{length of } B}{\text{length of } C}$. (10.)

For concentrated load W at centre: —

Compression in $S = \frac{W}{2} \times \frac{\text{length of } S}{\text{length of } R}$. (11.)

Tension in $R = W$.

Tension in $B = \frac{W}{2} \times \frac{\text{length of } B}{\text{length of } C}$. (12.)

For double-strut belly-rod truss (Fig. 4) *with distributed load W over whole girder:* —

Tension in $T = .367\,W \times \frac{\text{length of } T}{\text{length of } C}$. (13.)

$$\text{Compression in } C = .367\ W.$$

$$\text{Compression in } B \text{ or } D = .367\ W \times \frac{\text{length of } B}{\text{length of } C}. \qquad (14.)$$

For concentrated load W over each of the struts C: —

$$\text{Tension in } T = W \times \frac{\text{length of } T}{\text{length of } C}. \qquad (15.)$$

$$\text{Compression in } C = W.$$

$$\text{Compression in } B \text{ or tension in } D = W \times \frac{\text{length of } B}{\text{length of } C}. \qquad (16.)$$

For girder trussed as in Figure 5, *under a distributed load W over whole girder:* —

$$\text{Compression in } S = .367\ W \times \frac{\text{length of } S}{\text{length of } R}. \qquad (17.)$$

$$\text{Tension } R = .367\ W.$$

$$\text{Tension in } B \text{ or compress'n in } D = .367\ W \times \frac{\text{length of } B}{\text{length of } R}. \qquad (18.)$$

Under concentrated loads W applied at 2 *and* 3: —

$$\text{Compression in } S = W \times \frac{\text{length of } S}{\text{length of } B}. \qquad (19.)$$

$$\text{Tension in } R = W.$$

$$\text{Tension in } B \text{ or compression in } D = W \times \frac{\text{length of } B}{\text{length of } R}. \qquad (20.)$$

Trusses such as shown in Figures 4 and 5 should be divided so that the rods R, or the struts C, shall divide the length of the girder into three equal, or nearly equal, parts.

The lengths of the pieces, T, C, B, R, S, etc., should be measured on the centres of the pieces. Thus the length of R should be taken from the centre of the strut D to the centre of the tie-beam B; and the length of C should be measured from the centre of the rod, to the centre of the strut-beam B.

After determining the strains in the pieces by these formulæ, we may compute the area of the cross-sections, by the following rules:

$$\text{Area of cross-section of strut} = \frac{\text{Compression in strut}}{C}. \qquad (21.)$$

$$\text{Diameter of iron tie-rod} = \sqrt{\frac{\text{Tension in rod}}{9425^1}}. \qquad (22.)$$

For the beam B, we must compute its necessary area of cross-section as a tie, or strut (according to which truss we use), and also the area of cross-section required to support its load acting as a beam, and give a section to the beam equal to the sum of the two sections thus obtained.

$$\left.\begin{array}{l}\text{Area of cross-section of } B \text{ to}\\ \text{resist tension or compression.}\end{array}\right\} = \frac{\text{Tension}}{T} \text{ or } \frac{\text{Compression}}{C}. \qquad (23.)$$

In trusses 2 × 3: —

$$\text{Breadth of } B \text{ (as a beam,)} = \frac{W \times L}{2 \times D^2 \times A}. \qquad (24.)$$

In trusses 4 × 5: —

$$\text{Breadth of } B \text{ (as a beam,)} = \frac{W \times L}{\frac{5\ D^2 \times A}{2}}. \qquad (25.)$$

In these formulæ: —

$C =$

- 1000 lbs. per square inch for hard-pine and oak.
- 800 " " " " " spruce.
- 700 " " " " " white-pine.
- 13000 " " " " " cast-iron.

$T =$

- 2000 lbs. per square inch for hard-pine.
- 1800 " " " " " spruce.
- 1500 " " " " " white-pine.
- 10000 " " " " " wrought-iron.

$A =$

- 120 lbs. for hard-pine.
- 100 " " spruce and oak.
- 80 " " white-pine.

EXAMPLES.

To illustrate the method of computing the dimensions of the parts of girders of this kind, we will take two examples:

I. — Computation for a girder such as is shown in Figure 2 for a span of 30 feet, the trusses to be 12 feet on centres, and carrying a floor for which we should allow 100 pounds per square foot. The girder will consist of two beams, and one rod. We can allow the belly-rod T to come two feet below the beams B, and we will assume that the depth of the beams B will be 12 inches; then the length of C (which is measured from the centres of the beams) would be 30 inches. The length of B would of course be 15 feet, and by computation, or by scaling, we find the length of T to be 15 feet $2\frac{1}{2}$ inches.

The total load on the girder equals the span multiplied by the distance of girders on centres, × 100 pounds = 30 × 12 × 100 = 36000 pounds.

Then we find from formula (5)

$$\text{Tension in rod} = \tfrac{3}{10} \text{ of } 36000 \times \frac{182\frac{1}{2}''}{30''} = 65664 \text{ lbs.,}$$

and from formula (22): —

$$\text{Diameter of rod} = \sqrt{\frac{65664}{9425}} = 2\tfrac{5}{8}'' \text{ nearly.}$$

The strut beams we will make of spruce. The compression in the two strut beams = $\frac{3}{10}$ of 36000 × $\frac{180}{30}$ = 64800 pounds or 32400 pounds for each strut. To resist this compression would require $\frac{32400}{800}$ = 40 square inches of cross-section, which corresponds to a beam $3\frac{1}{3}''$ x 12″. The load on B = one-half of 36000 = 18000 pounds, and as there are two beams, this gives but 9000 pounds load on each beam.

[1] Allowing 12000 lbs. to be tension per square inch in the rod.

Then from formula (24)

$$B = \frac{9000 \times 15}{2 \times 144 \times 100} = 4\tfrac{2}{3}''$$

and adding to this the $3\frac{1}{3}''$ already obtained for compression, we have for strut-beams, two 8″ x 12″ spruce beams. The load on $C = \frac{5}{8}\ W$ = 22500 pounds. If we are to have a number of trusses all alike, it would be well to have a strut of cast-iron, but if we are to build but one, we might make the strut of oak. If of cast-iron, the strut should have $\frac{22500}{13000}$ = 1.8 square inches of cross-section at its smallest section, or about 1″ x 2″. If of oak it would require a section = $\frac{22500}{1000}$ = $22\frac{1}{2}$ square inches = $4\frac{1}{2}''$ x 5″ at its smallest section. Thus we have found that for our truss, we shall require two strut-beams 8″ x 12″ of spruce about 31 feet long, a belly-rod $2\frac{5}{8}''$ diameter, and a cast-iron strut 1″ x 2″ at its smallest end, or else an oak strut $4\frac{1}{2}''$ x 5″.

Example II. — It is desired to support a floor over a lecture-room 40 feet wide, by means of a trussed girder, and as the room above is to be used for electrical purposes it is desired to have a truss with very little iron in it, and so we use a truss such as is shown in Figure 5. Where the girders rest on the wall, there will be brick pilasters, having a projection of 6 inches, which will make the span of the truss 39 feet, and we will space the rods R, so as to divide the tie-beam into three equal spans of 13 feet each. The tie-beam will consist of two hard-pine beams, with the struts coming between them. We will have two rods, instead of one, at R, coming down each side of the strut, and passing through an iron casting below the beams, forming supports for them. The height of truss from centre to centre of timbers we must limit to 18 inches, and we will space the trusses 8 feet on centres. Then the total floor area supported by one girder equals 8′ x 39′ = 312 square feet. The heaviest load to which the floor will be subjected will be the weight of students, for which 75 pounds per square foot will be ample allowance, and the weight of the floor itself will be about 25 pounds, so that the total weight of the floor and load will be 100 pounds per square foot. This makes the total weight liable to come on one girder 31,200 pounds.

Then we find from formulæ (17 and 18): —

$$\text{Compression in struts} = .367\ W \times \frac{157''}{18''} = 106800 \text{ lbs.}$$

$$\text{Tension in both tie-beams} = .367\ W \times \frac{156''}{18''} = 106000 \text{ lbs.}$$

$$\text{Tension in both rods } R = .367\ W = 11450 \text{ lbs.}$$

The timber in the truss will be hard-pine, and hence we must have, $\frac{106800}{1000}$ = 107 square inches area of cross-section in the strut, which is equivalent to a 9″ x 12″ timber, or, as that is not a merchantable size, we will use a 10″ x 12″ strut. The tie-beams will each have to carry one-half of 106000 = 53000 pounds, and the area of cross-section to resist this = $\frac{53000}{2000}$ = 27″ or $2\frac{1}{4}''$ x 12″.

The distributed load on one section of each tie-beam, coming from the floor-joist = 13 × 8 × 100 = 10400 pounds, and from Formula 25 we have $B = \frac{W \times L}{5\text{-}2\ D^2 \times A} = \frac{10400 \times 13}{5\text{-}2\ 144 \times 120} = 3\frac{1}{8}''$.

Then the breadth of each tie-beam must be $3\frac{1}{8}'' + 2\frac{1}{4}'' = 5\frac{3}{8}''$ or say, 6,″ hence the tie-beams will be 6″ x 12.″ Each rod will have to carry 5725 pounds and their diameter will be $\sqrt{\frac{5725}{9425}} = \frac{3}{4}''$ nearly.

Thus we have found for the dimensions of the various pieces of the girder: —

Two tie-beams 6″ x 12.″ Two rods at each joint $\frac{3}{4}''$ in diameter, and strut-pieces 10″ x 12.″

BUILDING SUPERINTENDENCE. — XXX.

We need dwell no more upon the details of construction of our building, which would now differ little from those of any other, but will proceed at once to consider the necessary means for heating and ventilating the various rooms. Success in this point will be a matter of some difficulty, and we should have our scheme well prepared in advance, in order that the necessary distribution of flues and pipes may be effected to the best advantage.

Heating and Ventilation.

The only practicable method of conveying heat from a single source to all points of so large a building is to employ steam, and although steam-heating is in many respects inferior to that by means of hot water or ordinary furnaces, we have no alternative, and must try to mitigate the bad features of the system as much as possible. For the smaller rooms, the evil to be avoided is the closeness, from want of a fresh-air supply, which generally characterizes steam-heated offices, and to remedy this we shall do best to adopt what is known as the direct-indirect mode of heating, in which the radiators stand in the rooms, but are made to enclose a space into which air is admitted directly from the outside of the building, to pass, after being warmed by contact with the pipes of the radiator, into the room. The large hall in the second story must be heated in a somewhat different way, since it would not be possible to place radiators in the interior of the room, but it will be advantageous to keep them as near the part to be warmed as possible. The source

Steam.

Direct-Indirect Method.

of heat for the entire building will be a boiler placed in the basement, and we should get some notion of the necessary size of the boiler, and of the flue to carry off the smoke from it, in time to proportion the rooms suitably.

We can form a rough estimate of the radiating surface required, and thence of the sizes of pipes, boilers and flues, by allowing one-tenth of a square foot radiating surface to each square foot of plain wall and exposed roof surface, and seven-tenths of a square foot of radiating surface additional for each square foot of glass in the windows. The building has about 33,000 square feet of outside wall and 15,000 square feet of interior wall, and to this must be added 12,000 square feet of roof surface, exposed to the interior of the rooms, making 60,000 square feet of roof and wall, requiring 6,000 square feet of radiating surface. Of glass in the various openings there is about 5,600 square feet, seven-tenths of which will give 3,920 feet additional of radiating surface, making 9,920 square feet in all. The rule sometimes used, of allowing for direct-indirect radiation one and a half square feet of radiating surface for every 100 cubic feet of space contained in the building, would give, as we have about 900,000 cubic feet, 13,500 square feet of radiating surface; but this would be an excessive allowance for the large hall in the second story, and our first estimate is quite safe.

Estimate of Radiating Surface required.

By the usual rule for estimating, the heating surface of the boiler must be one-tenth that of the radiating surfaces, which would give here 992 square feet. This could be obtained by using a horizontal boiler 5 feet in diameter and 20 feet long, with about 60 tubes, but a single boiler of this kind would not work to such advantage as two, presenting together the same amount of heating surface; and there is here the further advantage in using two boilers, that one can be employed solely for heating the hall in the upper story, which is only occasionally in use, while the other can be devoted independently to warming the offices in the first story and basement of the building, which are occupied almost continuously. We must therefore make a new calculation, which shows us that the hall in the second story will require almost exactly one-half of the total radiating surface, so that two boilers just alike, each containing 500 square feet of heating surface will answer admirably. As an engineer will be constantly employed, it will be most convenient and economical to use two horizontal boilers, each 4 feet in diameter, 20 feet long, and containing 30 tubes. Each of these boilers will need, in order to be able to get up steam quickly, about 20 square feet of grate surface, and we shall require, to carry away the gases of combustion quickly from these grates, when both are in operation, a chimney of the best form with a sectional area of about 13 square inches to each square foot of grate surface. We have 40 square feet of grate surface, and must have, therefore, 520 square inches of sectional area of chimney. The height of the chimney would enter into the calculation to a certain extent, since the velocity of the current increases with the height of the heated column, but this advantage is soon lost in prolonging the shaft to an excessive height, and we shall obtain the best results by assuming only the average dimensions. The sectional area thus calculated should be obtained in a square or circular flue, as an oblong one, with the same area, has much less capacity for carrying away smoke. Considering the circumstances of our building, it will be found most advantageous to employ a circular cast-iron smoke-pipe, and to place it in the ventilating shaft which forms a portion of the tower, so that the heat radiated from it may assist the upward current in the ventilating flue. A pipe 28 inches in diameter will give the requisite sectional area, or a little more; and as it will be 128 feet in height we can be sure of a good velocity in it. The only objection to such a position for the chimney is the danger of disfiguring the upper portion of the tower with smoke; but by carrying the pipe through the roof of the smaller turret it will discharge the smoke at a sufficient distance from the main belfry to make sure that it will be carried away by the wind.

Necessary Heating Surface of Boiler.

Grate Surface.

Necessary Size of Chimney.

Shape of Flue.

The position of the boilers will be determined in general by that of the chimney, since it is desirable that the communication between the smoke connection of the boilers and the chimney should be as direct as possible, avoiding long pipes, which chill the gases, and underground flues, in which it is difficult to start a current. Fortunately, we have kept this point in view, and have arranged a room in the corner of the basement, close to the tower, large enough, not only for placing and managing the boilers, but for passing all around and over them, with sufficient space in front of them for handling the long flue-brushes and scrapers which will be required.

Position of Boilers.

We may now estimate roughly the size of the largest pipes which will be required, and we shall then know what special provision must be made in the construction of the building for placing them. Taking the safe rule that the main distributing pipes should have a sectional area equivalent to eight-tenths of a square inch for each 100 square feet of radiating surface supplied by them, we shall find, since each boiler furnishes steam to 4960 square feet of radiating surface, that each main steam-pipe must be a little more than 7 inches in diameter inside. As no pipe is made between 7 and 8 inch, and as 8 inch is much larger than would be necessary, we will determine upon 7-inch pipe. The risers, or pipes which run up to supply the radiators above will be small, none being more than 3 inches in diameter, and we shall have no difficulty in carrying them up in 4″ x 4″ recesses left in the wall at the proper places, which it will be well to mark on the plans at once.

Size of Main Pipes.

Before this can be done, however, we must determine all the main features of our system of ventilation as well as heating, and the sooner we make up our minds about this the better.

For the basement and first story rooms the plan of ventilation should be as simple as possible. Fresh air will be admitted behind the radiators in each room, which should stand under the windows, in order that the warmth from them may counteract the descending stream of cold air which, in winter, always flows over the surface of the glass, and foul air will best be taken out at two points, one near the top and the other near the bottom of the room. For the offices which have fireplaces, the opening of this will form the lower outlet, but another should be provided near the ceiling, communicating with a flue which may be carried up beside the fireplace flue. Where there is no fireplace, two flues, one opening near the floor, and the other near the ceiling, will be necessary. If the combined area of these outlets is made somewhat greater than that of the inlet, a gentle current will be maintained at all levels in the room, and the air kept in better condition than would be possible with a single outlet. As the small rooms are occupied only by a few officers and clerks, the supply of fresh air need not be very large, and a 4-inch round pipe to each radiator would make an ample inlet. For outlets, brick flues 8″ x 12″ will be best, and each flue may open with small registers both in basement and first story, remembering, however, that two openings must not be made in any flue in the same story, and that a flue which exhausts from the floor of the basement rooms must also, if it opens in the second story, exhaust from the floor there also, and that in the same way the ceiling registers in the first-story rooms should open into the flue which draws from the ceiling of the basement rooms. It need hardly be said that two fireplaces should not under any circumstances open into the same flue, and that the outlet registers in the basement rooms must not have a clear opening greater than half the sectional area of the flues into which they open, if any air is to be drawn into the same flues from the rooms above.

First-story Ventilation.

As the entrance-way and corridor in the first story and basement will naturally be more or less foul, a good current of air should at all times be maintained through them. The frequent opening of the doors will furnish a sufficient fresh-air supply, without bringing special pipes to the radiators, and it will be of advantage to restrict the inlets, but increase the outlet, encouraging the exhaust in other ways as much as possible, so that the draft from the corridor will be stronger than that in the rooms, and the current will, on opening the doors, tend consequently from the room into the corridor, and not *vice versa*. We will therefore provide only direct radiation for warming the corridors, and will conduct the air from them by a pipe passing through the closets at the end opposite the staircase to the gable wall, where a large flue is ready to receive it and carry it away. If there should be any difficulty in maintaining a current through this flue in cold weather, we can afterwards place a radiator in it, a little above the level of the second-story floor; but this wall is of great thickness, and we can easily build in it a flue 20″ x 20″, or 20″ x 24″, perfectly straight, and 100 feet high, which will be very little liable to a reversal of the current in it, even without artificial heating.

Having now provided for the separate removal of the air in the basement and first story, which we wish to prevent from ascending the stairs to annoy the occupants of the hall above, we must arrange for a special supply to the latter. The hall, with the gallery, will seat about 1000 persons, and to make them quite comfortable during an evening they should be furnished with at least 1500 cubic feet each of fresh air per hour; and this air must, moreover, be warmed in winter before delivery, and conducted throughout the room gently and uniformly, leaving no corner unvisited, and dispersing itself everywhere rapidly but without sensible currents. The system must include every part of the room, since any portion unswept by the flow of air will become a reservoir of decaying organic particles, which will diffuse themselves through the neighboring atmosphere for some distance in all directions. We will at first consider the winter ventilation only, that for summer being simpler, but completely different.

Ventilating Main Hall.

As in the rooms below, we have decided to use the direct-indirect method of steam heating in the hall, placing large radiators under the windows on all sides, and supplying each radiator with a given quantity of fresh air from the outside, to be warmed by contact with it, and then delivered into the room. The persons seated next the walls, who would otherwise be exposed to the chilling currents which descend along the surface of the windows, and to a much smaller extent along the plastering, will then be doubly protected, by the deflection of the cold currents on meeting the warm streams rising from the radiators, and by the direct influence of the warm rays falling upon their bodies from the hot pipes. As those occupying the seats at the edges of the room will thus be warmed by direct radiation, the air supplied to them need not be so warm as if it were the only source of heat; and the current delivered from the radiators, if sufficiently abundant, need not be raised above 60° Fahrenheit. This will answer also for the persons in the interior of the room, who, although cut off in part from the heat radiated by the steam coils, are less exposed to cold currents from the windows, and receive, moreover, a very considerable amount of warmth radiated from the bodies

of those around them. With this human warmth, however, is given off a certain amount of organic exhalation, so that the air in the centre of the room will be less pure than that nearer the fresh-air openings at the sides, and it will be necessary to furnish the middle portions with an additional supply. In many buildings this could be done by placing registers in the aisles between the seats, introducing at small intervals air taken fresh from the outside, warmed in the basement and sent up through pipes, but we have to bear in mind that our hall will often be used for dancing, so that registers in any part of the floor will be quite inadmissible, and some other place must be found for delivering the air.

There are but two other positions where inlets can be placed near the floor, one of these being the vertical front of the stage and the other the front of the gallery. Both of these will do, and we will arrange to use them, although in different ways. The front of the stage being separated, sometimes by an orchestra, sometimes merely by an open space, from the front rows of seats, may be used as a great register, throwing in air along its whole extent, and the air so introduced will, in its passage across the orchestra space, diffuse and mix itself with other currents, thereby losing its original impetus, and reaching the occupants of the front benches as a breeze so gentle as to be hardly felt. This stage front will, in fact, offer the best position in the room for the advantageous introduction of air, and we must arrange for taking it by ample openings from the outside into the space under the stage, and for warming it by radiators before delivering it into the auditorium. Some of the radiators may be placed close to the open gratings of the front, where their direct warmth will be felt by the persons nearest them, who are most exposed to the current.

By taking advantage of the shape of the space under the stage, we shall be able to secure a gentle but strong horizontal delivery of the warmed air, which will send it well toward the centre of the room before it begins to ascend, and the portion of the auditorium nearest the stage will thus be supplied with fresh air throughout its whole extent. For the remaining half we will take fresh air from the rear wall, under the front of the gallery, but in a manner slightly different from that employed for the first portion. In order to throw the supply from this direction well into the centre of the auditorium, we shall need to bring it in with considerable velocity, and as the seats for the audience extend to a point within a few feet of the gallery front, the current, if allowed to strike the persons sitting in them, would be felt as a disagreeable and even dangerous draught, so that we shall do best to introduce the greater part of it at a height of ten or twelve feet above the ground. In this way the main current will pass above the heads of those sitting near the inlet registers, the air diffusing itself so as to come within reach of the lungs of the audience only in proportion as it loses velocity. Under this arrangement, the greater the force with which it enters the room the more effective will the stream be in reaching and stirring up the atmosphere of the middle portions, and we may with advantage place the radiators for heating it in the basement, and bring the air up by pipes through the offices in the basement and first story. By making the pipes straight, with a curved elbow at the top to direct the current into the room, we shall obtain a heated column long enough to possess a very considerable buoyant tendency, and the air will be thrown into the hall with force enough to carry it to the centre before it will begin to rise. To complete the supply of fresh air for the room, we must furnish the occupants of the rear rows, who will receive little benefit from the currents passing over their heads, with some separate inlets near the floor, bringing the air in through exposed steam coils in the direct-indirect manner, so that, as at the sides of the room, the chill caused to the persons near by the movement of the incoming air, which, slight as it is, increases the evaporation from the skin, and causes a sensation of cold; together with the loss of heat due to radiation from the body to the cold walls, and the unpleasant draughts due to accidental currents, may be compensated by the warm rays from the pipes.

We shall now have, for the main portion of the auditorium, currents of fresh air proceeding from all sides, and meeting in the centre. The currents from front and rear are purposely directed with considerable force in a horizontal direction, and those from the sides, which are, so to speak, pressed upon by the descending cold air from the window surfaces, will be deflected in the same direction, and this impulse, aided by the natural adhesion of moving air to the surfaces with which it comes in contact, will serve to keep at least the heads of the occupants of the room in a pure and constantly renewed atmosphere. On the meeting of the currents in the middle, their horizontal movement will be destroyed, and the buoyant force due to the heat of the mass of air, which has grown warmer in passing among the bodies of the people, will assert itself, carrying the whole upward. Then, if not otherwise disposed of, it will become chilled by contact with the underside of the cold roof, and will descend along the surfaces of the roof, walls and windows, to mingle again with the incoming air from the radiators, and repeat the same round. This would not only contaminate the freshness of the new supply, but would very much reduce its amount, since air cannot be forced by ordinary means into a room which is full already, so that we must, to secure a continuance of the flow of pure air, remove the vitiated atmosphere before it can descend to the level of the incoming currents.

If the movement of the air were positive enough to carry it, after rising above the heads of the people, directly to the roof, it might be best to take it from the ridge, but in cold weather this would hardly be the case, much of the air becoming chilled and returning downward before reaching that point, so that we shall do better to exhaust it from the level of the cornice, a little above the line of separation between the lower, fresh, warm and horizontally moving stratum, and the upper stratum of vitiated, gradually-cooling and descending air. If the hall were of a perfectly simple shape, this upper stratum would move uniformly all around, but there are two causes which will give it a tendency toward the stage end of the room. One of these is the attraction of the stage ventilation, which draws the upper air sensibly toward the proscenium-arch; and the other is the pressure of the air from the gallery, which, introduced through radiators at the sides and rear, will move forward into the main body of the auditorium, pushing the stratum in front of it in the same direction. The mass of air which we wish to remove will then be impelled gently against the proscenium wall, and can be removed most effectively by openings in that wall, through which it can continue its course into the ventilation-shaft and away from the building. These openings can have any decorative shape, and should communicate with a conduit behind the proscenium wall, carried into the main ventilating flue.

THE ILLUSTRATIONS.

COMPETITIVE DESIGNS FOR $3,000-HOUSES SUBMITTED BY "*Crescent Moon*" AND BY "*Comfort*" [NO. 2].

SHOULD any of our non-professional readers desire to build according to either of these designs, we trust he will do the author the simple justice of putting the work into his hands. We shall always be pleased to put client and author into communication with each other.

HOUSE FOR H. C. G. BALS, ESQ., INDIANAPOLIS, IND. MESSRS. J. H. & A. H. STEM, ARCHITECTS, INDIANAPOLIS, IND.

THE first story is of stone, and the second story is covered with red tile. The house cost $15,000.

DESIGN FOR A RECEIVING TOMB. MR. C. B. ATWOOD, ARCHITECT, NEW YORK, N. Y.

THE $3,000-HOUSE COMPETITION. — XIII.

SPECIFICATION FOR DESIGN SUBMITTED BY "*Comfort*" (NO. 2).

CARPENTRY:—Frame of spruce. Sill and plate, 4″ x 6″; studs, 2″ x 4″ and 2″ x 3″. Floor joists, 2″ x 8″; rafters, 2″ x 7″. Floors bridged every 7′. Covering-boards, square-edged, hemlock. Outside finish of pine. Flashings of zinc. Under floors of hemlock. Upper floors, hard-pine in Kitchen; elsewhere, spruce, planed smooth. Inside finish, pine to paint. Doors and sashes, first quality factory. Doors of first story to have plain glass knobs and japanned butts; elsewhere to have mineral knobs. Blinds to all windows. Shelves in closets, pantry and china-closet. Front stairs, first flight, ash, others of pine.

Masonry: — Cellar wall, rubble-stone laid dry and pointed. Fireplaces, face-brick laid in red mortar, with tile hearths. Chimneys, piers and underpinning of common bricks laid in lime-mortar.

Painting:—Outside, two coats of white-lead and oil. Inside, one coat of shellac and two coats of paint.

Plastering: — Spruce laths, and two-coat work.

Plumbing: — Long hopper water-closet; soapstone sink in Kitchen and force-pump.

ESTIMATE OF QUANTITIES AND PRICES RULING NEAR BOSTON, MASS.

CARPENTRY.

10,000 feet spruce timber, @ $17	$170.00
5,000 feet " partition and furring stock, @ $16	80.00
8,000 feet hemlock under floor and covering boards, @ $15	120.00
37 M. pine shingles, @ $3.50	129.50
1,000 feet stock for outside finish	35.00
100 feet pine gutters	12.00
33 windows complete, frame, sash, glass, and blinds, @ $5	165.00
22 doors and frames, @ $3	66.00
Outside door, @ $15	15.00
Front porch	25.00
Inside finish	200.00
2,500 feet upper floors, @ 2½c	62.50
250 feet hard-pine kitchen floor, @ 5c	12.50
Stairs	90.00
Hardware and nails	150.00
Mill-work, carting and sundries	100.00
Labor	600.00
Mantels and buffet	50.00

MASONRY.

17 squares excavating, @ $2.50	$42.5
50 perch cellar stone, laid, @ $2.50	125.0
10,000 bricks, laid, @ $18	180.0
8 thimbles	4.0
900 yards plastering, @ 25c	225.0
2 fireplaces	40.0
Painting, not including glazing	175.0

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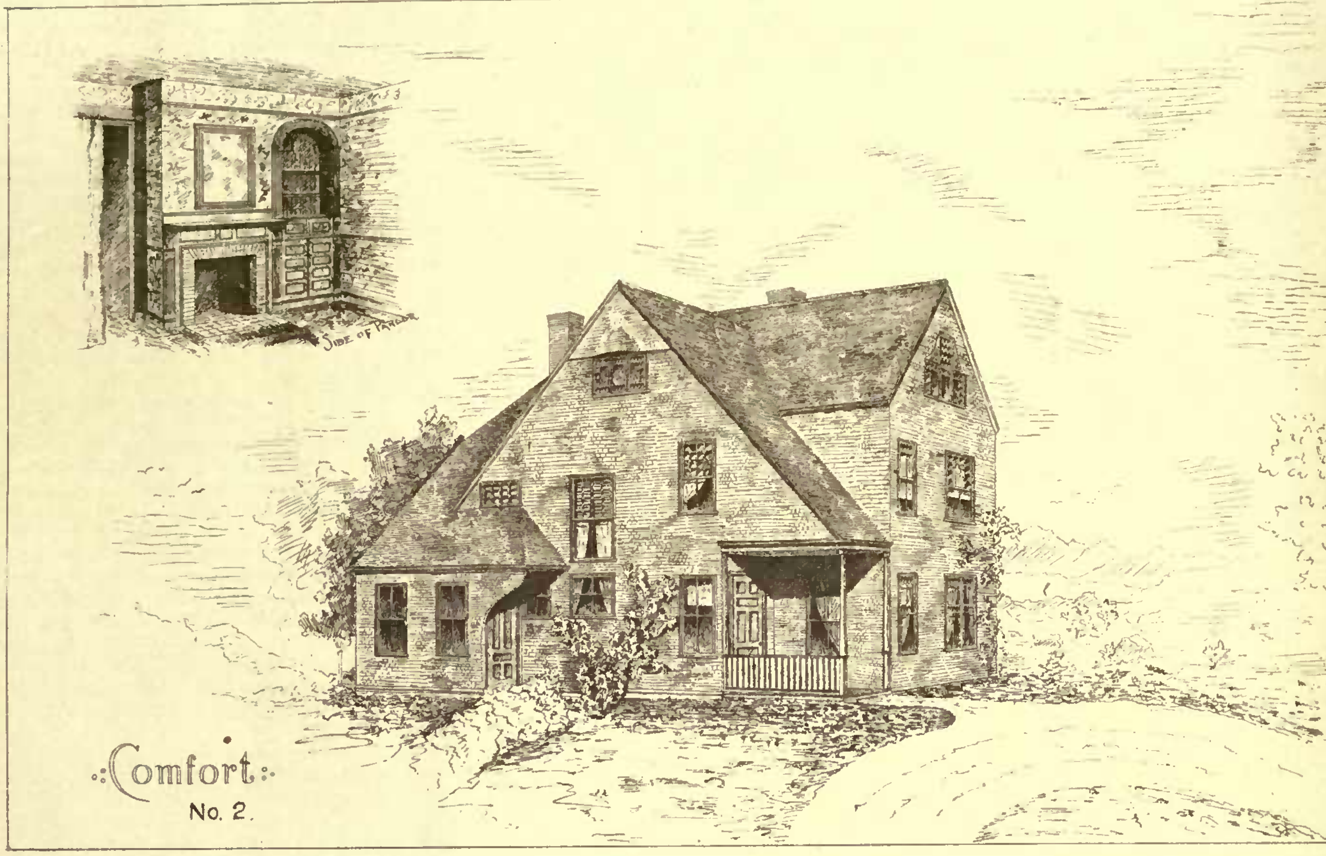

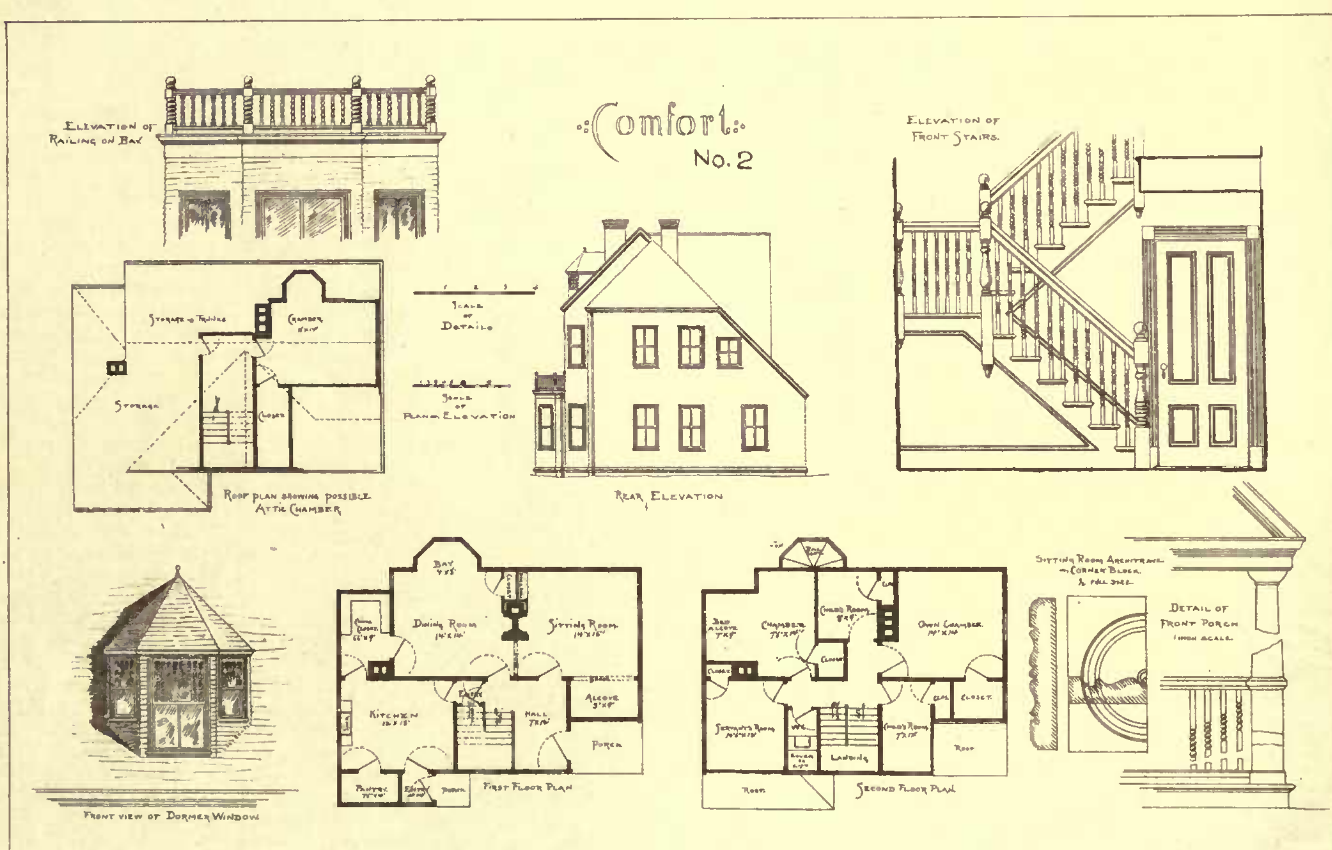

Heliotype Printing Co. 211 Tremont St. Boston

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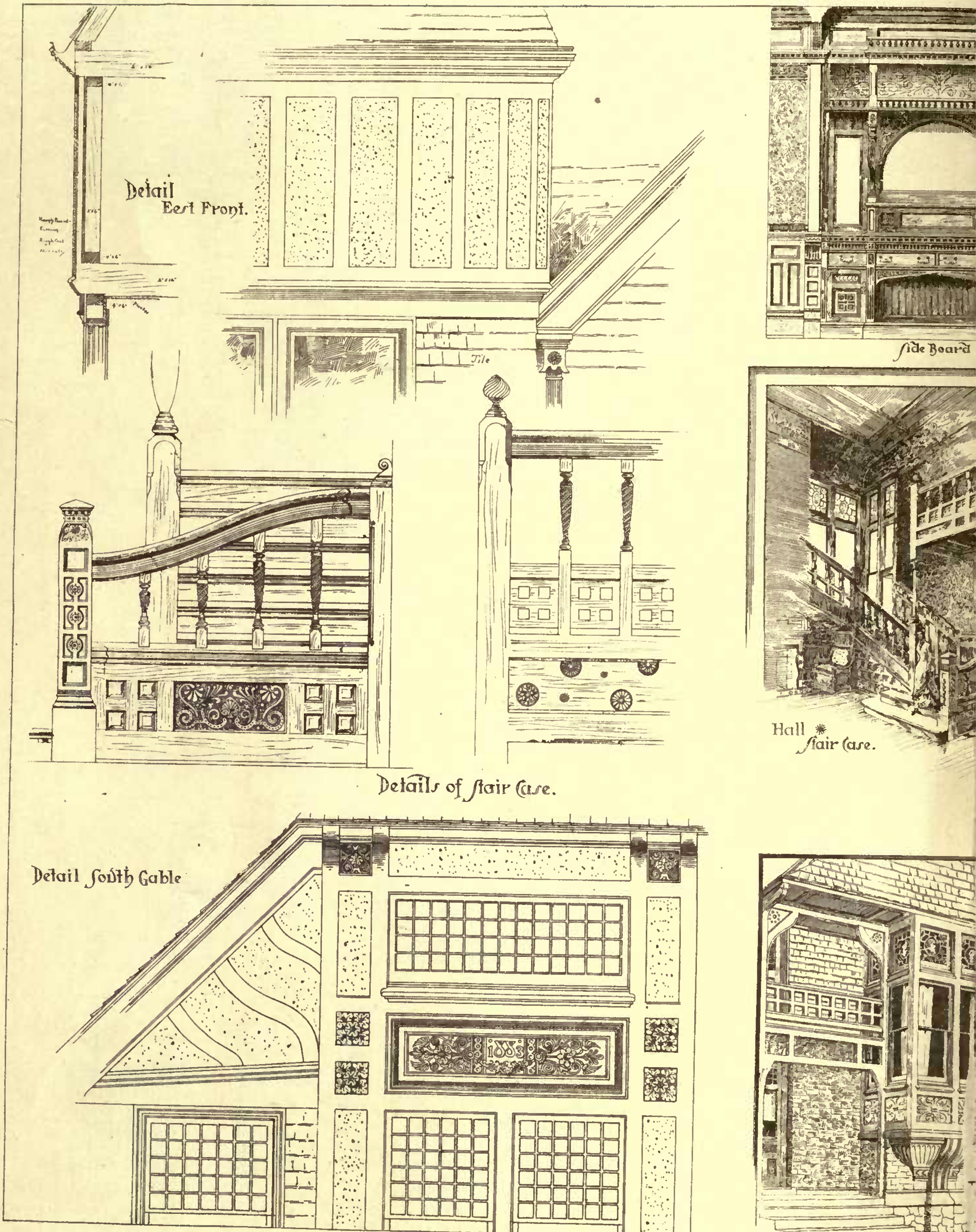

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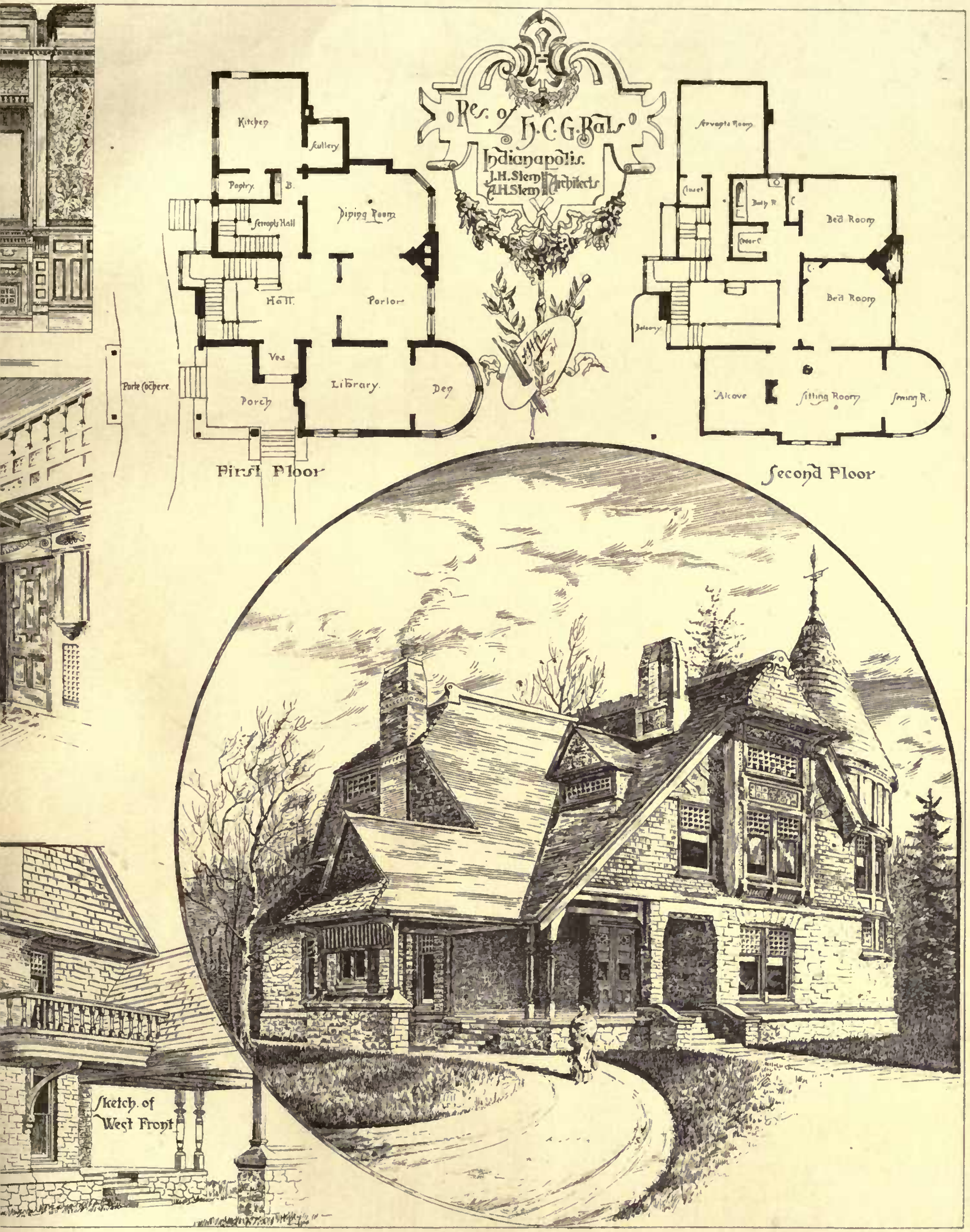

Heliotype Printing Co. 211 Tremont St. Boston

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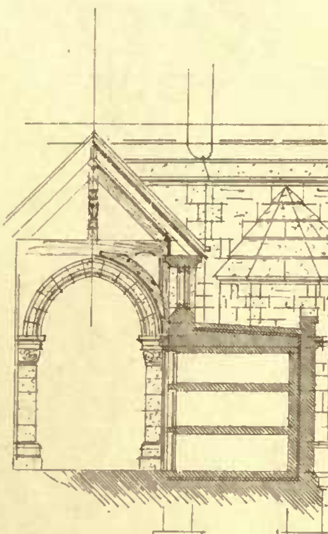
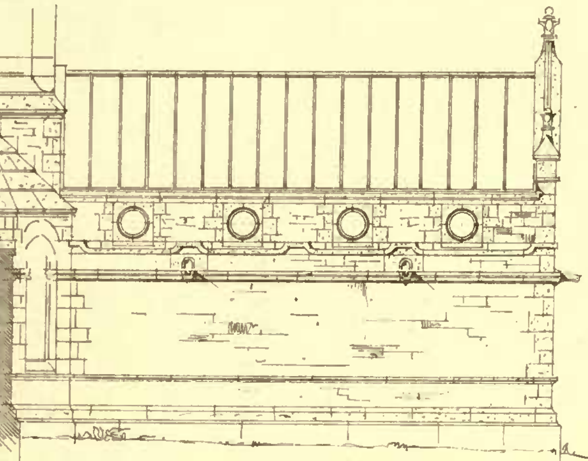
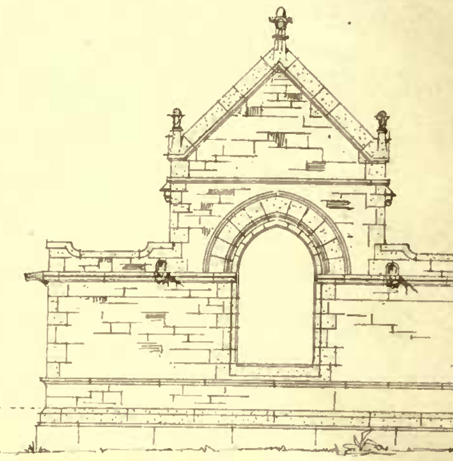


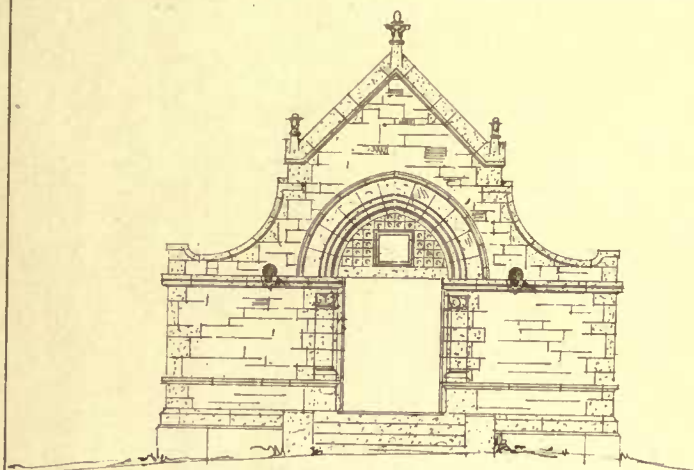
SECTION OF WING.



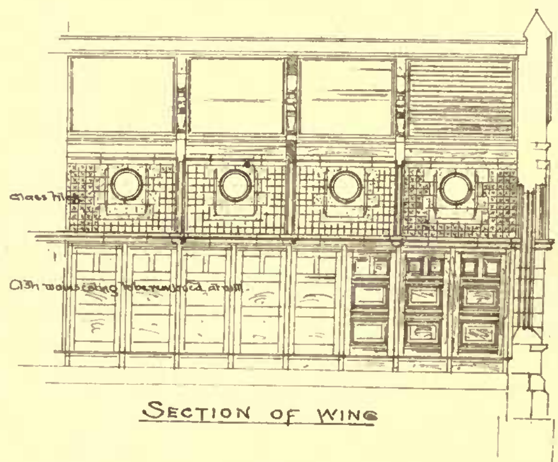
SIDE VIEW OF WING



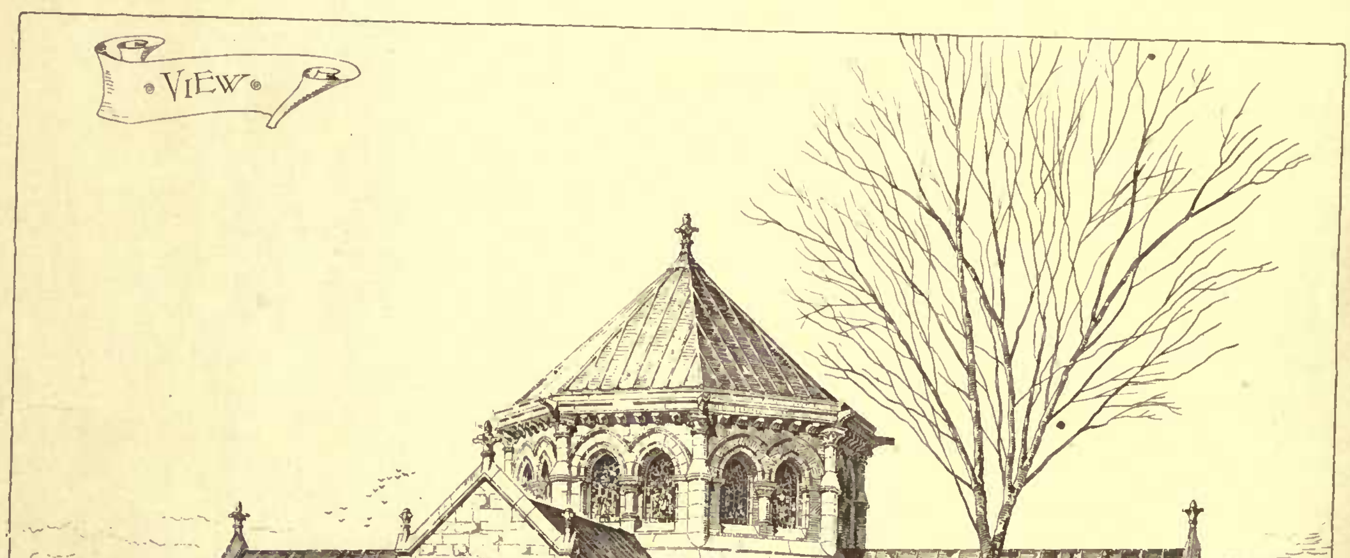
END VIEW OF WING



ELEVATION OF DOORWAY.

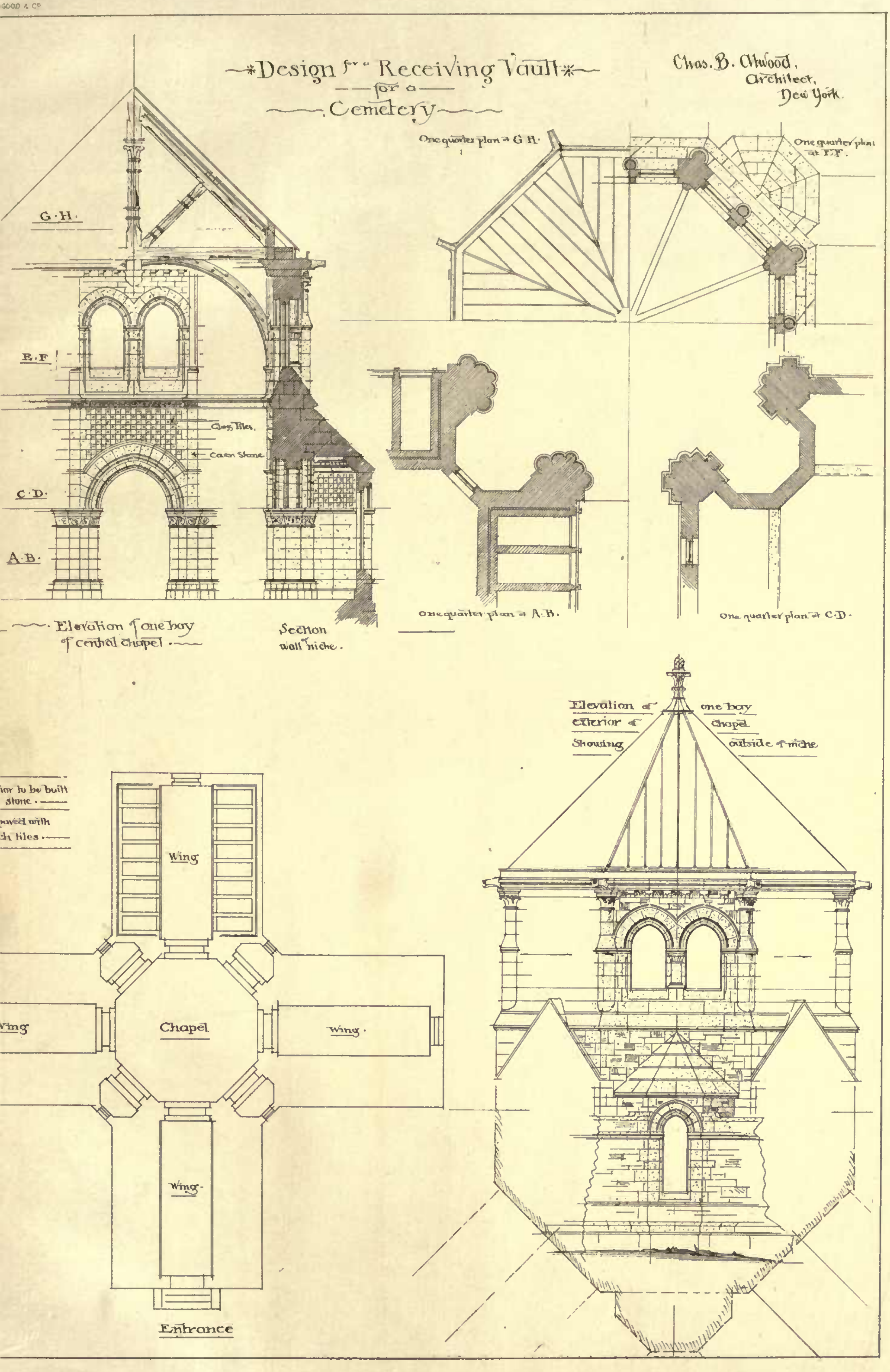


SECTION OF WING



PERSPECTIVE BY D.A. GREGG.

GOOD & Co



Court St Boston

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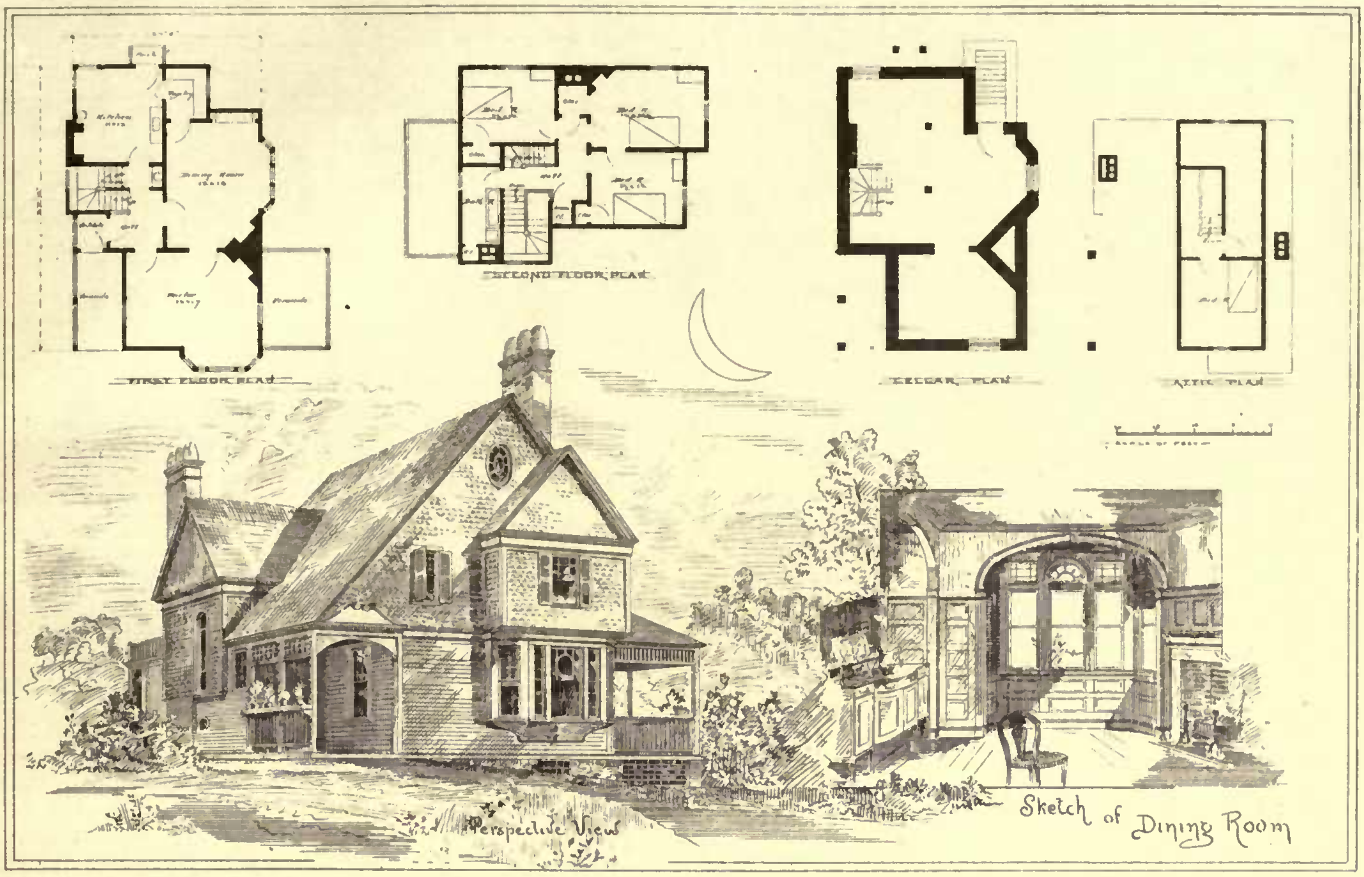
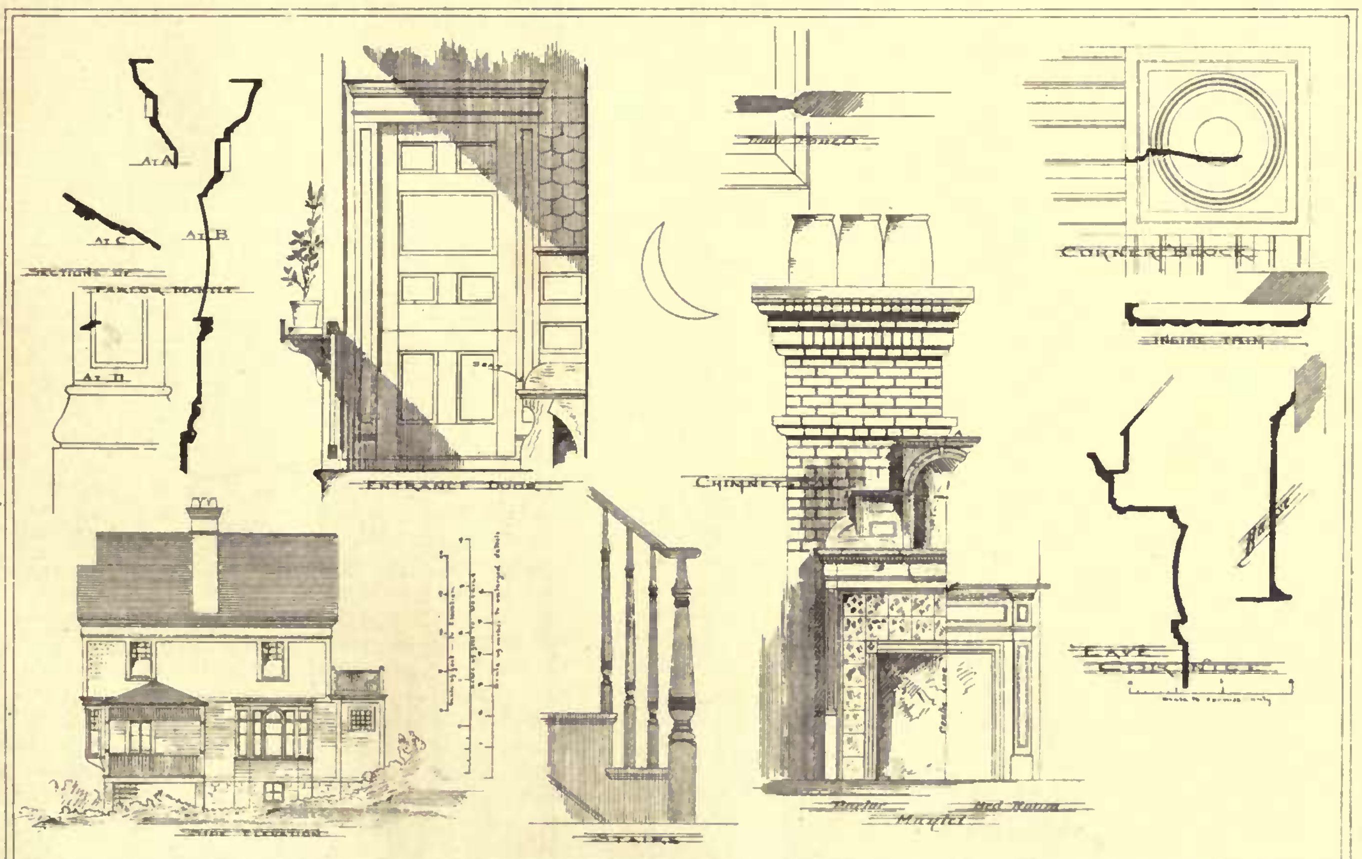




Heliotype Printing Co. 211 Tremont St. Boston

Conductors, 100 feet, 2½-inch zinc	$15.00
Plumbing	70.00
Total	$2,959.00
Architect's commission, 3½ %	103.56
	$3,062.56

SPECIFICATION FOR DESIGN SUBMITTED BY "*Crescent Moon.*"

All the work and materials to be warranted good quality.

Excavation:—The entire cellar to be excavated.

Stone-Work:—Basement walls to be of stone 18" thick, laid in mortar and neatly pointed.

Brickwork: — The chimneys to be hard-burned brick.

Lath and Plaster: — The entire first and second stories, and one room and hall in attic to be lathed and plastered.

Fireplaces: — The Parlor fireplaces to have tile hearth and facing, with cast-iron back; the Dining-room and second story will have brick hearth, back and facings.

Cistern:— Build brick cistern 8' diameter and 8' deep, properly cemented and made water-tight; same to have brick dome and tile drain connected with tin leaders.

CARPENTER'S WORK.

Size of Timbers:—Floor beams, 2" x 8"; posts, 4" x 6"; interties, 4" x 6"; plates, 3" x 6"; sills, 4" x 8"; rafters, 2" x 6"; valley rafters, 2" x 9"; ridge pieces, 2" x 8".

Bridging:—All floors to have one row of cross-bridging.

Roofs:—All cornices to be moulded, and have gutters and valleys properly tinned; roofs to be of shingles laid on slats; the gutters will have tin leaders to connect with rain-water drains; the one-story portion, Dining-room, bay-window and alcove will have roofs of tin.

Siding: — The frame to be covered with hemlock boards, and lined with heavy building paper; the first story will then be covered with clapboards; the second story and gables with shingles: verandas will have matched ceilings of pine.

Floors:—All inside floors to be of spruce, 5" wide; porch floors, pine.

Windows:—All windows will have double-hung sliding sash, glazed with single-thick French sheet-glass; bay-windows will have inside Venetian blinds; other windows, outside rolling blinds.

Doors:—All inside doors to be 1½" thick, and have moulded panels; outside door, as shown on detail drawing, 1¾" thick; all to be hung with butts, and have mortise-locks with porcelain furniture.

Trimming: — The whole of the trimming will be of pine, with reeded mouldings; the door and window to finish with corner and base blocks.

Stairs: — Stairs to be of pine, with ash newels, rails and balusters, as shown on detail drawings.

Pantries and Closets:—All to be fitted up with hanging hooks, and three shelves, as directed.

Wainscoting:—The Dining-room will be wainscoted as shown on interior sketch.

Mantels.—Fit up mantels as shown on detail drawings; the one in second story will be of pine; those in first story will be of ash.

Tank:—Fit up tank in attic, 3' x 4' and 3' deep.

Miscellaneous: — Case up sinks and bath-tub with narrow beaded boards; the bath to have hard-wood top.

PAINTING.

The whole of the work usually painted, both outside and in, to have three coats of good quality white-lead and oil paint, of such color as directed; the chimneys above roofs to be painted red, with black pointing.

PLUMBING.

Tank in attic to be lined with lead; fit up planished bath-tub where shown; to be a cast-iron sink in Kitchen, with cast-iron legs and back; fit up range and water-back, connected with galvanized-iron 20-gallon boiler; the wash-tubs, sink and bath will be supplied with hot and cold water; fit up force-pump in Kitchen connected with cistern; same to supply the Kitchen sink and tank.

ESTIMATE FOR VICINITY OF NEW YORK.

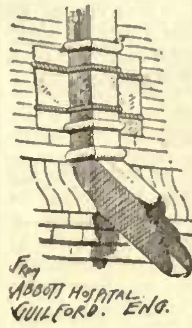
Carpenter work	$1,800.00	Painting	$175.00
Mason's "	900.00	Architect's fee	250.00
Tinning and plumbing	350.00		
Total			$3,475.00

The above is an estimate from reliable builders near New York; they decline, however, to give the bill of quantities, on the ground that it is impossible to estimate the number of days' work.

You will observe I have put the architect's fee at $250, or 5 % on $5,000, believing this to be consistent with the schedule of the A. I. A., which states: "For work under $5,000 a special rate in excess," and as the architect's work on a $3,000-house is fully equal to that of a house costing $5,000, I consider the above charge to be correct.

THE ENGLISH CHANNEL TUNNEL. — Sir John Hawkshaw, civil engineer, recently stated that there were no engineering difficulties in the way of the formation of the tunnel between France and England, and that its maintenance would be cheap. He estimated the cost of the tunnel at £8,000,000, and said the work would occupy in construction eight years. He had no doubt as to the financial success of the undertaking. It was reasonable to reckon upon 2,000,000 passengers being carried through the tunnel annually at 6*s.* per head, and 1,200,000 tons of goods at 5*s.* per ton. That would produce a revenue of £900,000. Allowing forty per cent for working expenses, 6.75 per cent could then be paid upon the capital of £8,000,000. As one means of defence, it had been suggested that steps should be taken by which the tunnel could be flooded. He, however, was of opinion that arrangements could be made to throw up a mass of shingle inside the tunnel and thus prevent its use. If necessary, the tunnel could be blown up. Should more than one tunnel be constructed, the question whether or not they should all be defended by forts was a question for a military man. If there were several tunnels they could be easily defended by the same fortifications on the English side. The tunnel would be 180 feet below the bed of the channel. — *Exchange.*

THE SALE OF THE HURLBERT COLLECTIONS.



THERE is being sold at auction in New York while this issue of the *American Architect* is passing through the press, a collection of peculiar interest. It consists of pictures, furniture, tapestries and miscellaneous bric-à-brac gathered together during many years by Mr. William Henry Hurlbert, who is well known as an intelligent judge of the works of art of past times as well as of our own. It is only of the pictures, however, that I wish to make brief mention here. In the strict and not the advertising sense of the word they form a "unique" collection — one which is not likely to be duplicated, that is, on this side of the water. It is not often one can say of an auction sale that there is not a bad picture in the lot. But one can say it here, even of the very few modern French examples by such men as Merle and Lefebvre which have rather an alien look amid their finer surroundings, for even these few are very good specimens in their own way. Much more interesting, however, are many small canvases by the great Frenchmen of an earlier day — by Diaz, Lambinet, Michel, Faustin-Besson, Daubigny and others — almost all painted in the early days of the artists' activity and showing their powers in their most characteristic phases, before popularity and money-making had wrought their inevitable modifications. A beautiful Marilhat, one of his well-known works, is an example of a master very seldom seen on this side of the water. English pictures, too, are not wanting, as for example a Nasmyth and a little Leslie which last will be a revelation to those who know Leslie only by the crude, chalky colors of his later work as shown in the Lenox Library collection. A fine Sir Joshua, one of several versions he painted of the child with the mouse's cage, is in excellent preservation with the flesh tones still intact. Of yet greater interest, however, are the old pictures in the collection — one or two excellent and important examples of the Italian schools and a number of fine Dutch landscapes — among others a sea piece by Van Der Velde with exquisitely transparent water, two Hobbemas (one of which with dark trees and a glowing sky could not easily be surpassed), a tiny Backhuysen, a battle-piece by Teniers, and two Ruysdaels. One of these last is, I think, the gem of the collection—a small picture showing a flat Dutch landscape with a broad road that runs straight away from the spectator in the middle of the composition. In spite of this formality in theme, and in spite of the non-picturesqueness of the subject and the loving accuracy with which details have been treated, I know of no landscape of any school which is more full of grandeur and of sentiment, and it is in admirable condition, the soft blues of the exquisite sky not having faded out as is too often the case with similar works, and the golden tone of the whole being perfectly preserved. It will be a pity if all these pictures are allowed to pass into private keeping without at least an effort to secure some of them for our museums. And it will be a still greater pity, perhaps, if Mr. Hurlbert's Turner — well-known to fame but so secluded for many years that but few have seen it — is allowed to share a similar fate. Indeed there is a worse danger yet to be apprehended here; for this is a picture of which the dealers know the value, and which, if it falls into their hands, will undoubtedly be taken back to England for sale. I do not hesitate to say that it is a canvas which will show Turner to untravelled American eyes as he has never been shown before, and will prove to them for the first time that the praise which has been lavished on him by English critics has not been the mistaken eulogy of an eccentric, unbalanced, if splendid, genius. The pictures in the Lenox Library give no idea of the Turner we see on this Venetian canvas, and a dozen "Slave Ships" would be all too little to exchange for such a work. It was painted in Turner's best period when his talent had reached its highest and most personal development but had not yet fallen into the apparently wilful extravagances which mark the time when the "Slave Ship" was executed. It is a large picture, in excellent condition, pitched in a high key with a preponderance of whites and blues and with the brilliant sails of Venetian fishing-boats as its strongest notes. The catalogue will give, I believe, the "pedigree" of the picture, but it is not of the sort that needs extrinsic recommendations. Never before has there been such a chance to get possession for our public institutions of a characteristic example of Turner's most admirable mood. And it is doubtful whether, should this chance be lost, the future will supply a wiser generation with another. As will be remembered, Mr. Thomas Moran had for years a fine landscape which he attributed with much apparent justice to Turner's earlier years. Some judges said "not a Turner but an Old Chrome," but most, I think, agreed with the owner in his attribution. At all events the "Conway Castle" was a beautiful example of the kind of work done by Turner in his earlier years and by the other great men of that moment. It might well have found an honored place in one of our museums, and had we then secured this Venetian canvas of Mr. Hurlbert's to put beside it we should have had data by which the artist and his progressive art might have been studied and understood. No greater contrast could have been conceived and none more instructive to the student, whether of art principles in general, or of the life and work of the greatest of English landscape painters. The "Conway Castle" is unfortunately lost to us forever; but the "Venice" we may

still secure. Its price will doubtless be high, but it is to be hoped there is some lover of art among us wise enough to see its value and generous enough to give it to our public, either in this city or in another; or if this is too much to ask, let us hope there is some one who will save it for America even if in the semi-seclusion of a private gallery. M. G. van Rensselaer.

THE BLISTERING OF PAINT.

TESTIMONIAL, IN WROUGHT IRON, TO Mr V BALTARD, PARIS, FRANCE — Revue Générale de l'Arch.

The subject of the blistering of paint has from time to time engrossed the attention of practical men; but, so far as we can follow it in the literature pertaining to the building trade, its cause has never been clearly laid down, and hence it is a detail enshrouded in mystery.

We propose, in the present notice, to lay down some general rules that govern this phenomenon, if we may so call it, and from the same to draw some practical conclusions, the object of which will be to set the question at rest. The blistering of paint is in a large measure traceable to the position of the painted surface; it is usually found on work presenting a south aspect or exposed to the full rays of the sun. As a defect it is associated with the summer season, the English humid, sunless winters being opposed to its action. The deduction to be drawn from this is that it is the effect of heat. Paint, we know, is a body both mineral and metallic, made into a plastic state by oil, the object of which is to keep out the moisture from exposed surfaces in our buildings and other works, and to offer, on internal works, a uniform and pleasing surface to the eye. The oil used is linseed, which by boiling attains setting or drying qualities: its thick or heavy nature, when loaded with mineral and metallic matters, being let down for temporary or working purposes by spirits of turpentine, a volatile spirit that is a mere aid to the spreading of the paint. Paint so largely composed of oil will never fairly set or assume a dry state, one uninfluenced by heat. However dry and brittle it may appear, it is capable of being rendered soft and plastic by the application of heat, and hence the hand-stove of the painters is the most ordinary instrument for the removal of old paint. We mention this, for it is clear that, approach the subject as we will, we find heat the prime cause of the blistering of paint.

Closing in with our subject and bringing it into narrower lines, we find blistering, properly speaking, wholly confined to wood as a base or groundwork. It is true it is not unknown to iron or plaster; but in these cases it is variant in form, and not blistering in the true sense of the term. The blistering of paint on iron is not traceable to the softening of the paint and the shelling up of the same, but to water making its way to the naked iron, through some crack or defect in the paint, and becoming an active agent in oxidation. The blister thus formed is clearly the separation of the film of paint from the iron, by the formation of rust upon the face, which, as a foreign material, forms an effectual separation of the two bodies. The extension of these blisters is dependent upon the supply of water, and, unlike the true blister, is not dependent upon heat or a south or sunny aspect. The blistering of paint on iron occurs in any aspect or position in the full light, or in the dark, in the summer or the winter, the destructive agent being water; it is dependent upon no other conditions. The blistering of paint upon plaster is in a large degree analagous to that of iron, inasmuch as it is formed by the disintegration of the base by the action of water. Painted plaster-work, so long as water can be kept from percolating through the cracks or faults, or gaining entrance from above by filtration, or from below by capillary action, is a highly durable material; but the moment water gains a footing, the lime in some degree is dissolved, and, upon being removed and re-deposited, undergoes the process of recrystallization; a powdery substance is thus formed, that comes as a stranger between the paint and the plaster, in which respect it bears a strong resemblance to rust, the result of the oxidation of iron. Large faces of plaster are subject to fractures from expansion under the heat of the sun, or from the lifting of the upper members of a building, consequent upon the admission of water from gutters or copings, the lifting being the result of secondary crystallization set up in the joints of mortar. We thus get an explanation of the fact that the blistering of paint, so to speak, always occurs in the neighborhood of cracks or fractures in the plaster, and is more pronounced in the cornice or upper part than in any other part of a building. In proof of its being the result of crystallization, the face of the plaster is always found to be covered over with powdered lime. The painter, finding this, takes care to saturate the disintegrated face of the framework in effecting repairs; but this, as he finds to his chagrin, is no protection against the recurrence of the evil, for so long as water or moisture is admitted at any point, so long will this abnormal blistering ensue. The blistering of paint upon plaster-work, like that upon iron, is not dependent upon heat; it is a chemical action set up by water upon a body of dry lime in a partial state of crystallization; it is caused by the lime dissolving and its removal — it may be in but an infinitesimal degree — and its recrystallization. Upon the water evaporating, the result is a dry powder that works an effectual separation between the film of paint and the groundwork of plaster, and it does not attach itself to either of the bodies, but remains a powder until the film of paint or blister is removed, when it may be dusted off with a brush.

The blistering of paint upon wood is distinct in its order, and is the general blister known in the trade. It occurs on the face of wood-work exposed to the sun, and is traceable to the influence of heat. It is not pronounced in the case of new work, where the body of paint is not great; but it is a great evil and an eyesore on old work, where the coats of paint are layered one on the other. Wood as a groundwork is a porous body, highly charged with moisture in a natural state, and never free from it in a so-called dry state, when used in exposed situations. It may be taken that wood, during the winter season, or one-half of the year, is absorbing moisture. We may see this in our outer doors, our gates, our sliding sashes, and our shutters, for the joiner is constantly being called into requisition to ease the same. This moisture, so largely present in the atmosphere, cannot be kept out of the wood by the most careful painting. In our shop-fronts it has ready access to the back of the wood-work, the face sides being the only ones which are painted; in our doors and gates it is absorbed from the sills or the ground, from the fact that the lower edges are unpainted. There is always some portion of the wood-work hid from the eye, which is unpainted, and there the system of absorption is active during the winter or rainy season. Wood in this state, during the hottest days in the summer, will make efforts to throw off this moisture. We then find the heat of the sun applied with great force to the painted face, and the unpainted face to be in the cold shade. The effect of this powerful heat is to draw the moisture to the face of the wood, where its course is arrested by sundry impervious coats of paint; it is here generated into steam, the expansive power of which forces away the paint, and the familiar blister is formed. Paint, as a mineral or metallic body, does not incorporate with the wood; it simply adheres thereto, forcing its fronds, so to speak, into the pores of the wood, and filling up the interstices formed by the bundles of fibres. Hence we find that paint fails to adhere to highly-resinous or greasy woods, and the knots themselves, from being hard and compact, must be faced with knotting composition as a ground for the paint. Paint, in parting company with wood, or, in other words, forming a blister, will adopt one of two courses: —

First, to tear itself clear from its association with the wood. Examined by a glass it will be found to have a rough underface, the exact counterpart of the porous face of the wood. It will resemble the inner face of beech-bark, which presents innumerable vertical plates, the casts, as it were, of little interstices in the woody face of the tree.

Second, to tear itself clear from the first coating or priming on the face of the wood, the outer coats only forming the blister. This latter is the most ordinary course followed by heat or steam blisters, but in cold-water blisters, a form of blister not generally known, but one upon which we shall offer a few remarks, the first of the above courses is followed, and the paint as a body is forced from the wood.

It must be understood that there are certain well-defined laws regulating the blistering of paint. The groundwork must be a soft, porous, absorbent wood in which a sufficient amount of moisture is present to create steam beneath the impervious coating of paint. The paint must be of sufficient body or texture to be impervious. If it is thin, the natural accompaniment of new work, it will not blister, for it is not impervious, and the steam will escape into the rarefied atmosphere; and hence we find blistering wholly associated with old work upon which a great body of paint is present.

The remedy for this ordinary steam-blistering of paint is, on the one hand, to paint the back side of the wood as well as the ends and edges, and so prevent the absorption of moisture during the wet or winter season. This we admit is a most difficult operation. On the other hand, hard, close, unabsorbent woods, like mahogany should be used as a groundwork where practical; failing these, the body of the paint should be thin, light, or semi-porous, and not dense or impervious. Proof of this is found in paint which has accumulated in thickness being removed by the hand-stove to prevent blistering. This is done upon soft wood as a basis, but not upon hard wood, iron, or plaster. A deal might be said upon the removal of paint by heat and chemicals, such as potash, Egyptian clay, and other compositions; but we refrain from touching upon it from the fact that it is outside the heading of this chapter.

A blister upon iron will be found to embrace the whole body of the paint, and to be ferruginous on the inner face, showing that the separation is in the iron itself. A blister upon plaster will, in like degree, embrace the whole body of paint, and be coated with lime or powder on its inner face, showing that the separation is in the plaster; indeed, this is patent, for the blister will often be found with a thick coating of plaster adhering to the same, showing that the disintegration has occurred in the body or centre of the plaster. This is a well-known fact, as, upon the repainting of plaster faces, the brick-layer is often brought upon the scene to repair the damage and restore the face for the painter.

A blister upon wood does not necessarily embrace the whole body of the paint, as the separation will often take place between the

priming, or first coat, and the subsequent coats, and it never brings away a backing of the ground-work, unless the wood be rotten, in which case it cannot be called a blister, but a falling-in or giving way of the ground-work. The rotting of wood with a painted face is a pronounced illustration of the absorbent nature of wood, when associated at the back or unprotected face with damp or moisture; such wood, if exposed to the sun on the painted face, will be the first to blister, and that which is the dryest and least absorbent in its texture, will be the last.

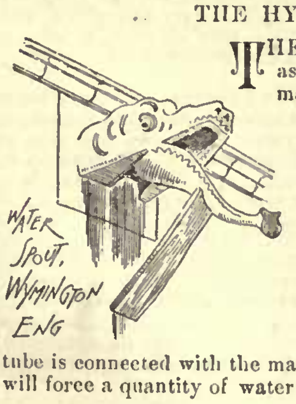
The blistering of paint upon wood is not, as is generally believed, the direct effects of heat upon the oil in the paint; if it were, we should find it taking the same action upon iron or plaster, which, we need scarcely say, is not the case. Heat in the case as above noted is a secondary agency, the primary one being steam generated from the moisture in the porous wood below or behind the impervious face or coating of paint; it is truly speaking a blister; but it is also a blow, expansion or cavity, caused by the generation of steam. Blisters formed on wood, if cut or pricked at an early stage, so as to let out the steam, may be erased by carefully rubbing them down to their original bed, especially so if the separation has taken place on the face of the wood, in preference to the face of the priming or first coat of paint.

In our researches on the subject under notice we have been materially assisted by investigating the rare phenomenon of cold-water blisters on painted wood-work. In December last, the contraction of the lead in the gutters of a house erected in the first quarter of the present century, or the expansion of the water allowed to lodge therein, by the action of frost, caused the lead to split, and upon a thaw ensuing water made its way into the interior of the house. In its downward course it took a cupboard, built in the recess of a chimney on the first floor, every part of which was saturated. The door has a moulded architrave wrought in Quebec pine; one of the jambs of this architrave imbibed an abundance of water at the mitre, which, coursing down the wood by natural gravitation, displaced the paint, and blisters appeared upon the surface identical with those formed by heat on wood-work exposed to the sun. Here was a case of blisters forming in the depth of winter on old internal wood-work, in a position where the sun at no time could shine or act upon it. These blisters, unlike those formed by steam under the influence of the sun, had a baggy appearance, as if weighted or loaded with water. Upon marking their position we found them to be travelling downwards, at the rate of about one-quarter of an inch per day. These blisters upon being pricked or cut, gave out their water, and the skin of paint allowed itself to be rubbed down into its old position, where it adhered after the supply of water had been cut off. We found that the paint, as a body, had detached itself from the naked wood, and that its inner face was an imprint of that porous body.

Water, as we know, is foreign to paint, for paint will not adhere to wet or unseasoned wood. In like manner, old paint will detach itself from wood, if the wood is highly porous and charged or saturated with moisture. In the case in point, the head of the architrave, where the grain or pores of the wood was fixed in a horizontal position, did not blister on the face. The blisters only occurred in the upper part of the architrave forming the jamb, in which the grain or pores of the wood were in an upright or perpendicular position. The vessels were here weighted or charged with water, which, as it worked to the face, forced off the paint and lodged in blisters so formed by its agency.

Blisters so formed by cold water, gravitating or coursing down the fibres of the wood, suggest the fact that they are formed with the exercise of but little force, and they prepare us for the admission that the generation of steam by the action of the sun is sufficient to account for their presence on ordinary wood-work. It must be borne in mind that the formation of these cold-water blisters could not occur except on very soft or porous wood. We were not prepared to admit that the architrave in question was so hard or dense in its texture as even Baltic red or yellow fir; or if it was fir, that it was then a wholly porous sap-wood. On investigation, we found it to be the ordinary Quebec pine, a very light, soft, porous, sponge-like wood — a class of wood highly suitable for the development of such a phenomenon; but one whose porous nature throws great light upon the subject of blistering of paint. — *W. S., in The Building News.*

THE HYDRAULIC RAM.



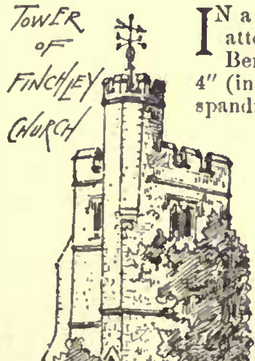
THE first invention of this motive power is ascribed to Mr. Whitehurst, a watchmaker, of Derby, England, in 1772. The operation of the hydraulic ram is as follows: A spring or other constant supply of water is used, from which a pipe of the necessary diameter is laid to a point below; the greater the fall the better. The lower end is furnished with a valve, so arranged that when the water in the pipe has acquired a given velocity it will be closed. This, of course, suddenly stops the current. If near the lower end a perpendicular tube is connected with the main tube, this sudden arrest of the fluid will force a quantity of water from the main tube to a given height. The pressure on the lower valve being thus relieved, it again opens, and the current again moves, is again arrested, and again the water rises in the tube. If an air-chamber, like the one in a pump, is affixed in connection with the bottom in the upright pipe, it will secure a more regular and constant flow of the water in the perpendicular pipe. It will also furnish security against the bursting of the pipes by the sudden closing of the valve. Estimating the general average as sixty per cent, the following rules are given for ascertaining the several possible results: —

To determine the height to which water can be raised, multiply the quantity of water to pass through the ram by the whole fall on the site, and this product by .60. Then divide this product by the quantity to be raised in the same time. Thus, if the supply be thirty gallons per minute, and the fall but one foot, how high will this raise one gallon per minute? $30 \times 1 = 30 \times .60 = 18 \div 1 = 18$, the height to which this quantity can be raised. To determine how much water can be raised a given height, multiply the quantity on the site by its fall, and this product by .60, and then divide by the given height. If one hundred gallons flow per minute, the fall be six feet, and the height required seventy feet: $100 \times 6 = 600 \times .60 = 360 \div 70 = 5$ gallons per minute. The sources of mistake that frequently occur in the rules are perhaps these: First, the want of accuracy in the .60 which is assumed as the average. This ratio will vary more or less with the length of the tubes through which the water is forced, the number or extent of angles or curves, the nature and condition of the tubes through which it passes, and this on the supposition that the machine itself is perfect in its construction.

When the ram was first invented it was supposed that it could be used for raising large quantities of water, but as yet all attempts to elevate large volumes have failed, on account of the violent shock of the valves and the heavy pulsations of the machine, which are so severe as to render it impossible to make them sufficiently strong to stand any length of time. It is to be hoped that some of these difficulties will be removed, as the ram is a most valuable machine in supplying water to mansions and factories or mills in the country, and thereby lessening the risk of fire, at little or no expense beyond the first cost of the machine. The size of a discharge-pipe for a hydraulic ram depends upon the distance the water has to be forced, the amount of pressure in the supply-pipe, etc.

To increase the capacity of a hydraulic ram, drill or file a hole about $\frac{1}{32}$ inch in diameter in the supply-pipe, about a foot above the place where it enters the ram. At every stroke of the ram a small stream will be discharged from this orifice. This at first sight would seem to decrease the power instead of augmenting it, but when the reaction takes place in the pipe there seems to be a small quantity of air sucked in, and this air is probably liberated from the water when it reaches the air-chamber, thus increasing the pressure. The writer tried this on a farm belonging to Judge Calvin E. Pratt, of the New York Supreme Court, and found it to increase materially the power of the ram. The ram was a No. 4, under four-foot fall, and after this plan was adopted it sent a one-half inch stream of water to a height of twenty-five feet, twelve hundred feet distant from the ram, and is well worth a trial by those using rams. Another method of calculation is to multiply the quantity supplied by the spring in gallons per minute by sixty-five, and multiply the product by the number of feet fall, and divide this product by one hundred times the height to which the water is to be elevated. The result will be the quantity of water raised per minute. — *The Metal Worker.*

BITUMINIZED BRICKS.



IN a recent issue, the *Deutsche Bauzeitung* called attention to an experiment in street-paving at Berlin. Bricks of the dimensions of 8″ x 4″ x 4″ (in the quality of the usual so-called white spandrel-bricks) have been employed, which have been impregnated with asphalt by a patent vacuum process. By this mode of treatment, after the expulsion of air and water has taken place, the bricks absorb from fifteen to twenty per cent of bitumen, and the porous, easily destructible substance is changed into a tough, elastic mass, said to be capable of resisting pressure and concussion in an exceptional degree, and resisting the ingress of moisture. The bricks are then laid upon a concrete foundation, six inches in thickness, by means of hot tar.

The traffic at the point in question has always been heavy, as no less than one thousand light vehicles per hour are said to cross the spot chosen for the trial, in addition to thirteen hundred tram-car journeys over this portion of the roadway. No previous system of paving has been found to last beyond three months without showing signs of injury, and the opinion is expressed that this new paving material has the needful resisting properties, as it is rougher than compressed asphalt, and harder than wood. Besides these advantages, the points of junction are said to afford a firmer foothold for the horses, and there is no ab-

sorption of moisture. The importance of the new discovery is also dwelt upon with special reference to the construction of water-proof walls, stable-pavements, counter walls, etc.

A more recent issue of the *Thonindustrie Zeitung* discusses the matter in a critical spirit, and records the fact that at the point named some of the bricks display, after about three months' wear, such crumbling that they have had to be replaced, which has, however, been done with comparative ease and rapidity. It is remarked that the rather sudden failure of these bricks is the more surprising as they had not previously exhibited signs of wearing away, and doubts are expressed whether the material chosen to be impregnated is really the most suitable for the purpose. An examination by Herr Rühne of specimens of the defective bricks seems to have raised in his mind some doubts as to the efficacy of the process as really increasing their resisting properties. Machine-made bricks had been used, which are, as a rule, wanting in homogeneousness, and although the surface was decidedly strengthened by the process, the middle of some of the bricks had apparently not been impregnated. He does not, however, attach any conclusive importance to these appearances, as some of the crumbled bricks were impregnated throughout. The reason of the sudden wearing away when once the outer surface has been affected is not easy to explain, as frost could not have penetrated the surface, and it is not supposed that it could have rendered the asphalt brittle. Hence it is argued that the want of complete success may be fairly attributed to the kind of brick chosen, and possibly in some degree to some peculiarity in the manner in which the process of impregnation has been carried out. The hope is expressed that further experience will remedy the partial imperfections which have been found to exist in the application of the principle indicated.

A correspondent of the same journal remarks that wall-bricks can, by an old method, be impregnated up to twenty-three per cent of their original weight, with a mixture of asphalt and tar, and that he fails to see the advantages of the new process. He gives various interesting details in proof of his assertion that the strength of the impregnated brick is dependent upon its qualities before impregnation, and that the process in question cannot remedy such defects as have originally existed in the bricks.

According to the quoted reports of the municipal authorities of Stuttgart, the system of laying down the bricks impregnated according to the older process, between the tramway lines, has proved decidedly successful. An extension of its application is recommended on the grounds of the durability thus arrived at, as well as the more comfortable track which is obtained, and the contingent economy in the supply of horses for the requirements of the traffic.

"RAMBLING SKETCHES."

New York, May 15, 1883.

To the Editors of the American Architect: —

Gentlemen, — Can you inform me where I can procure a copy of "Rambling Sketches" by T. Raffles Davison? Would also like to know the price of the book. Yours truly, J. W. C.

[You can obtain Mr. Davison's "Rambling Sketches" of Mr. H. P. Kenway, 220 Devonshire St., Boston. Price, $5.25. — Eds. American Architect.]

"ORIGINAL PORTRAITS OF WASHINGTON."

204 So. Fifth St., Philadelphia, May 24, 1883.

To the Editors of the American Architect: —

Dear Sirs, — My attention has been called to a card presumably from Miss Elizabeth Bryant Johnston, compiler of the work entitled *Original Portraits of Washington*, reviewed by me in your paper of June 10, 1882, in which Miss Johnston accepts my offer of material to improve and correct her work in a subsequent edition. I am glad to know that a new edition is to be published, but wish that it might be an entirely new book; however that may be, if Miss Johnston will send me a working copy of her book — that is, interleaved sheets — I will gladly make such corrections and additions as my *data* will afford. Very respectfully yours, Chas. Henry Hart.

SUB-SURFACE DRAINAGE.

Winnepeg, May 22, 1883.

To the Editors of the American Architect: —

Gentlemen, — I have read with much pleasure and profit the various articles which have appeared from time to time in your valuable paper on the subject of sewerage for isolated houses or small towns, and more especially those having reference to sub-surface irrigation. As this system cannot be satisfactorily used in a cold country where the frost enters the ground from three to four feet, I should be glad if some of your correspondents would deal with the question under the circumstances referred to, that is, the disposal of sewage in a country where tbe winters are long and cold.

Yours respectfully, J. Greenfield.

[We believe that Colonel Waring is of the opinion that a properly arranged sub-surface drainage system is not prevented from working properly by any degree of cold, the heat latent in the waste liquids being sufficient to thaw a passage for each discharge from the flush-tank with sufficient rapidity to prevent congelation taking place within the pipes. — Eds. American Architect.]

BOOKS FOR BEGINNERS.

Richmond, May 23, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Will you be so kind as to inform me through the *American Architect*, what books you would advise a person who desires to learn architecture to study?

Yours respectfully, G.

[For the history of architecture, read Fergusson's "*History of Architecture*," three volumes; for the "orders," study Vignola or Sir William Chambers; for a review of architecture in all its branches, study Gwilt's "*Encyclopedia of Architecture*." These books can be ordered through any first-class book dealer. For construction, get "*Notes on Building Construction*," published in three volumes by J. B. Lippincott, Philadelphia, price $13.00, Trautwine's "*Hand-book for Engineers and Architects*," Tredgold's "*Carpentry;*" and for American practice, study the papers on "*Building Superintendence*" published in the *American Architect* during the past two years. — Eds. American Architect.]

OUR ILLUSTRATIONS.

Spring Valley, Minn., May 24, 1883.

To the Editors of the American Architect: —

Gentlemen, — Some of your Western subscribers fail to see any point of interest in your competition for a $3,000-house, and do not know how it is going to benefit anybody unless, indeed, it should be to convince the authors of the plans of their real capacity in that line; but as we have no interest whatever in that, we should prefer to see something else illustrated in your valuable paper.

Respectfully submitted for your consideration by

H. J. Andersen.

[We are fully conscious that there may be other than "Western" architects who would prefer to have us publish illustrations of a more exalted architectural character than the designs for $3,000-houses. But we trust that the discontented will possess themselves in patience, and bear in mind that the editors have to consider the rights and interests of three important parties: (1) members of the profession, of greater or less training and capacity; (2) a very large number of non-professional subscribers, who pay their money for the sole purpose of obtaining designs which will assist them in reaching a decision as to what sort of a dwelling-house to build, or what architect to employ; and (3) the pecuniary interest of the publishers, who do not maintain this journal on purely philanthropic principles. We have not the least misgiving that each subscriber would not receive full value for his money, even should he choose to destroy the prints of these cheap houses. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Royal Fir. — One of the finest conifers in Germany, known as the Royal Fir, stands near the village of Albernhau in the Erzgebirge Mountains. Its diameter, forty inches above ground, is six feet ten inches, sufficient to conceal a horse and rider placed lengthwise behind the trunk. It begins ramifying at a height of thirty-four feet, and the full elevation to top of crown measures one hundred and fifty-four feet. It is thought to be the tallest and strongest representative of the species, not only in Germany, but in the whole of Europe. This noble tree, which is supposed to be five hundred years old, now shows signs of decay, having died out on the apex of the crown since the year 1874. The enormous dimensions of the tree may be better realized by cordwood measure. The shaft is estimated at 51⅞ cords; limbs and brushwood, 12⅞ cords, making in all 64⅝ cords.

Testing a Lightning-Conductor. — The spire of the General Assembly Hall, Edinburgh, has just been fitted up with a new lightning-conductor. Some doubt having been expressed, says the *Electrical Review*, as to the efficiency of the old conductor, it was resolved to subject it to a strict test, and for this purpose a copper wire was carried up one side of the spire and attached to the conductor on the other side. When the connection was effected, the electrical resistance is said to have reached the "very alarming amount of eight hundred ohms." The conductor was jointed together by screw-couplings, and this extraordinary resistance is explained to have been due to the "defective character of many of these couplings."

Excavating at Luxor. — The great temple at Luxor is being excavated, and the inhabitants of the mud huts that filled every part are being evicted by wholesale. Professor Maspéro has found in Upper Egypt the sepulchre of one Shes-Horhotep, which is a marvel of painting and design. It has been taken to pieces, slab by slab, and sent by water to the Boolak Museum. A new royal sepulchre and seventeen fine mummies of the Greek period are only part of Professor Maspéro's spring campaign. Greek, Syriac and Coptic inscriptions of the fifth century, A.D., both formal and *graffiti*, have been obtained, as well as Coptic sermons written on stone in red ink. — *Exchange.*

The Wood Pavement in the Champs Elysées. — The new wood pavement in the Champs Elysées, which extended only half the length of the avenue, has stood the test of an entire winter, and so it is to be laid to the Arc de Triomphe. This pavement has been put down by an English company. The process of putting it down is as follows: The ground is first excavated about a foot in depth. A layer of stones about the size of walnuts, and mixed with cement, is then laid down. On this a second coat of cement, about an inch in thickness, is carefully spread. The blocks, which are previously prepared by being saturated with some resinous compound into which tar enters largely, are set upon this cement; they are six inches thick by a foot in length and three and a half inches in breadth. A space is left between each block, and after they are laid a thick preparation of tar is poured over them, followed by an application of fine gravel. Finally, the interstices are filled with cement. — *Exchange.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

276,991. BRICK-MACHINE. — James C. Anderson, Highland Park, Ill.

277,021. SAW. — Emile H. Gabus, Stryker, O.

277,026. SAW-HANDLE. — Joseph Hall and Louis St. Andre, Clear Lake, Wis.

277,049. FIRE-ESCAPE. — Samuel T. Mickey, Salem, N. C.

277,058. DEVICE FOR LATHING. — Stuart Perry, Newport, N. Y.

277,073. SAFETY-ATTACHMENT FOR ELEVATORS. — Peter S. Singer, Chicago, Ill.

277,090. SANDPAPERING-MACHINE. — Henry T. Weirbach and Mahlon C. Bleiling, Allentown, Pa.

277,105. BIT-STOCK. — William J. Bayrer, Southington, Conn.

277,110. PNEUMATIC INDICATOR AND SPEAKING-TUBE. — Jacob Capron, New York, N. Y.

277,111. WINDOW-SCREEN. — John W. Carman, Fort Atkinson, Wis.

277,113. AIR-GAS MACHINE. — James P. Clifford, Brooklyn, N. Y.

277,124. FIRE-ESCAPE LADDER. — Andrew C. Ferris, Hackensack, N. J.

277,156. FIRE-ESCAPE TOWER. — Simeon J. Pardessus, Brooklyn, N. Y.

277,158. BENCH-VISE. — Granville W. Pittman, Keokuk, Iowa.

277,172. WATER-CLOSET TANK OR CISTERN. — Henry Sutcliffe and Wright Sutcliffe, Halifax, County of York, England.

277,17-. FIRE-ESCAPE. — Alfred S. Trafton, Portsmouth, N. H.

277,202. SCREW-DRIVER. — August Benson, Worcester, Mass.

277,222. FLEXIBLE FIRE-ESCAPE LADDER. — Wesley C. Bush, Brooklyn, N. Y.

277,226. SAFETY-ATTACHMENT FOR ELEVATORS. — Charles A. Carscadin and Frank P. Fish, New York, N. Y.

277,251. METALLIC ROOFING. — Thomas F. Fitzberger and John Fitzberger, Baltimore, Md.

277,293. WATER-CLOSET APPARATUS. — Karl E. Kritch, Cleveland, O.

277,295. EXTENSION-LOCK FOR DOORS. — John Kuster, Jr., Stamford, Conn.

277,296. RINGING BURGLAR-ALARM. — Allison W. Lawson, Midway, Ala.

277,311. MODE OF CONSTRUCTING ANVILS. — William C. McCarthy, Pittsburgh, Pa.

277,332. MACHINE FOR FLATTENING THE SEAMS OF SHEET-METAL ROOFING. — William Painter, Jas. L. Murrill, and Louis H. Keizer, Baltimore, Md.

277,340. FIRE-ESCAPE. — Albert L. Pitney, Washington, D. C.

277,343. SAFETY-ATTACHMENT FOR ELEVATORS. — Alva C. Rice, Worcester, Mass.

277,370. SPRING-HINGE. — Jas. Spruce, Waterbury, Conn.

277,376. FIRE-ESCAPE. — William H. Stuckey, Covington, Ky.

277,381. BLIND-STOP. — Leonard Tilton, Brooklyn, N. Y.

277,386. FIRE-ESCAPE. — Albrecht Vogt, Rochester, N. Y.

277,389. FIRE-ESCAPE. — John D. Weed, Buffalo, N. Y.

277,415. FIRE-ESCAPE. — Harlan Fairbanks, Boston, Mass.

277,421. BRICK-KILN. — Willis N. Graves, St. Louis, Mo.

277,430. TAP-WRENCH. — Albert J. Smart, Greenfield, Mass.

277,433. FIRE-ESCAPE. — Abraham Todd and Leander H. McKee, Constantia, N. Y.

277,441. SASH-FASTENER. — Henry Bausch, Rochester, N. Y.

277,481. AUTOMATIC FIRE-EXTINGUISHER. — Richard W. Grinnell and Frederick Grinnell, Providence, R. I.

277,485. METALLIC SKYLIGHT. — George Hayes, New York, N. Y.

277,486. CLEANING CISTERNS. — William S. Henson, Newark, N. J.

277,502. SAW-HANDLE. — John Nelmeyer, Trenton, O.

277,508. SPEAKING-TUBE APPARATUS. — George J. Quinsler, Boston, Mass.

277,511. PUNCHING AND RIVETING ANVIL. — John C. Rothbarth, Buffalo, N. Y.

277,526. FIRE-GRATE. — Benj. S. Wash, St. Louis, Mo.

277,532. LEWIS. — Charles W. Ash, Boston, Mass.

277,542. DOOR-HANGER. — Chas. W. Bullard, Maywood, Ill.

277,556. BENCH-PLANE. — Daniel M. Fielding, Decatur, Ill.

277,561. SCREW-DRIVER. — Isaiah M. Furbish, Augusta, Me.

277,570. VISE. — William Johnson, Lambertville, N. J.

277,590. WRENCH. — Joseph McAlpin, San Francisco, Cal.

277,591. SASH-FASTENER. — William L. McKelvey, Youngstown, O.

277,592. VISE. — Norman M. McLeod, Cambridge, Mass.

277,599. SCREW-DRIVER. — Daniel Nei, St. Louis, Mich.

277,600. FIRE-ESCAPE. — Frederick Newhouse and Henry Mooers, Toledo, O.

277,601. SOLDERING-IRON. — Albert P. Olmstead, West Troy, N. Y.

277,608. FLEXIBLE-JOINTED SHUTTER. — John P. Recker, Indianapolis, Ind.

277,616. DOOR-LOCK. — William Rowe, Haverhill, Mass.

277,656. TRAP. — Robert Williams Armstrong, Belleek, County of Fermanagh, Ireland.

277,663. COMBINED SHUTTER-WORKER AND BLIND-SLAT OPERATOR. — David Beal, Doylestown, O.

277,680. LOCK-HINGE. — John K. Clark, Buffalo, N. Y.

277,695. FORMATION OF DEEP WELLS IN QUICK-SAND, ETC. — Jarvis B. Edson, Adams, Mass.

277,767. BENCH-PLANE. — Frank A. Mershon, Philadelphia, Pa.

277,810. WOOD-PRESERVING COMPOSITION. — Luke N. Teachman, Lincoln, Neb.

277,814. FIRE-PROOF CEILING. — James E. Ware, New York, N. Y.

277,820. DOOR-CHECK. — Rufus Wright, Akron, O.

277,858. WEATHER-STRIP. — Thomas Urie, Boulder, Col.

277,859. COUNTERSINK FOR BITS. — Richard J. Welles, Chicago, Ill.

277,879. DOOR-LATCH. — Conrad G. Burkhardt, Chicago, Ill.

277,881. SPRING-HINGE. — Theodore Butler, Cleveland, O.

277,882–883. TOOL-HOLDER FOR GRINDSTONES. — John I. Carr, Chicago, Ill.

277,887. DOUBLE-ACTING OUTWARD-PULLING WEATHER-STRIP. — Edward Conklin, Channahon, Ill.

277,888. PLUMBER'S TRAP. — Patrick Connolly, Brooklyn, N. Y.

277,890. WEATHER-BOARDING GAUGE, CLAMP AND SAW-GUIDE. — Thomas M. Dedman, Des Moines, Iowa.

277,891. FIRE-ESCAPE. — Albert C. Ellithorpe, Chicago, Ill.

277,914. MACHINE FOR DRESSING STONE. — Alexander McDonald, Cambridge, Mass.

277,925. HINGE. — Charles Pfauntz, St. Louis, Mo.

277,953. MECHANICS' SCAFFOLD. — Lacy T. Steele, Raymond City, W. Va.

277,963. WASH-STAND. — George E. Waring, Jr., Newport, R. I.

277,966. AUGER. — James L. Whiteside, Chattanooga, Tenn.

277,971. WINDOW-SHUTTER. — Joseph Wrightsman, Harper, Kan.

277,973. CALIPERS. — George Amborn, Jr., and Edwin D. Chaplin, Pawtucket, R. I.

277,980. FASTENER FOR THE MEETING-RAILS OF SASHES. — Henry L. Blodgett, Chicago, Ill.

277,992. FIRE-ESCAPE. — Rolla M. Chase, Bethel, Vt.

277,995. FIRE-ESCAPE. — William A. Cornyn, Pontiac, Mich.

278,028. LIGHTNING-ROD. — Augustus C. Lobdell, Chicago, Ill.

278,034. FIRE-ESCAPE. — Friedrich Melchior, New York, N. Y.

278,042. SASH-BALANCE. — Daniel L. Phipps, Millington, Mich.

278,045. SEWER-TRAP. — Geo. A. Reich, San Francisco, Cal.

278,050. PLATFORM-ELEVATOR. — George Ruddell, New York, N. Y.

278,053. RATCHET-WRENCH AND DRILL. — William C. Shipherd, Cleveland, O.

278,066. DOOR. — John M. J. Wernert, Paw Paw, Mich.

278,128. SHINGLE-SAWING MACHINE. — William H. Gray, West Falls, Md.

278,135. WRENCH. — Jerome M. Hamrick, Buffalo Gap, Tex.

278,171. FIRE-ESCAPE. — William Oldroyd, Columbus, O.

278,177. MORTISING-TOOL. — Charles H. Pettit, Jersey City, N. J.

278,189. BALL-COCK. — William Smith, San Francisco, Cal.

278,191. GRATE. — Sidney D. Spence, Ludlow Grove, O.

278,200. BALUSTER. — William J. Tait, Jersey City, N. J.

278,204. SELF-CLOSING HATCHWAY. — George W. Van Allen, New York, N. Y.

278,225. CALIPERS. — Ralph Crittenden, Hartford, and Robert G. Henry, Waterbury, Conn.

278,238. EMBOSSING UPON PLASTERED WALLS AND OTHER SURFACES. — John H. Harding, Milwaukee, Wis.

278,249. FIRE-ESCAPE. — Henry H. Little, Chambersburg, Pa.

278,261. SCREW-DRIVER. — Christopher H. Olson, Decatur, Ill.

278,264. PIPE-TONGS. — Thos. Patton, Cleveland, O.

278,265. WRENCH. — Daniel R. Porter, Randolph, Mass.

278,268. BRICK-MOULD AND BRICK. — Louis Prince, Washington, D. C.

278,278. ROOFING OR SHEATHING PAPER. — Augustine Sackett, New York, N. Y.

278,301. FIRE-ESCAPE. — David Welsh, Washington, D. C.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report twenty-seven permits have been granted, the more important of which are the following:

Gustav Krug, three-st'y brick building, w s Jasper St., rear of, s w cor. Saratoga and Jasper Sts.

Thompson & Stone, 4 two-st'y brick buildings, w s Chester St., between Fayette St. and Fairmount Ave.

Henry Lancaster, two-st'y brick building, w s Pennsylvania Ave., between George and Biddle Sts.

J. L. Stieff, three-st'y brick building, n s Baltimore St., between Pine and Pearl Sts.

Valentine Noba, 2 two-st'y brick buildings, n s Hudson St., e of Hair St.

Amanda Lumpkin, two-st'y brick building, e s Chesapeake St., between Hudson and Dillon Sts.

Amos V. Colley, 8 two-st'y brick buildings, s s Winchester St., n of Fremont St.; and 8 two-st'y brick buildings w s Carlton St., s of Winchester St.; and 2 two-st'y brick buildings, on Ten-foot Alley, rear of Carlton St., s of Winchester St.

J. Frank Buzby, 2 two-st'y brick buildings, in rear of e s Warner St., s of Henrietta St., and two-st'y brick stable, w s China Alley.

Boston.

BUILDING PERMITS. — *Brick.* — *Oxford Terrace*, Ward 11, for Nathan Matthews, apartment-house, 48' x 93', four-st'y flat.

Oxford Terrace, Ward 11, for Nathan Matthews, apartment-house, 48' x 64', four-st'y flat.

Oxford Terrace, Ward 11, for Nathan Matthews, apartment-house, 20' and 6' x 80' and 88', four-st'y flat; Thomas R. White, builder.

A St., Nos. 42 and 44, Ward 13, for Thomas Smith, 2 dwells., 22' x 40' each, four-st'y flat.

Tremont St., Nos. 1411 and 1413, Ward 22, for Emanuel Nathan, 2 dwells. and stores, 25' x 39', three-st'y flat; ell, 13' x 28'; Gottleib Merz.

Beacon St., No. 184, rear, Ward 11, for Lucius M. Sargent, stable, 25' x 40', one-st'y flat; Richardson & Young, builders.

Newbury St., near West Chester Park, Ward 11, for Arthur Hunnewell, dwell. and stable, 25' x 80', two-st'y flat.

Commercial St., No. 464, Ward 6, for Wm. Carr, dwell., 24' x 26', four-st'y flat; G. T. Burnham, builder.

Sherman St., near Dale St., Ward 21, for Charles Carter, bakery, 19' x 30', one-st'y flat; G. A. Brackett, builder.

Clark St., No. 30, Ward 6, for Patrick Canney, dwell. and store, 14' x 23', four-st'y flat; D. Sullivan & Son, builders.

Wood. — *Bunker Hill St., Nos. 135 and 137, and Monument St., Nos. 35 and 37*, Ward 3, for Michael Kelley, dwell. and store, 19' and 22' x 37', ell, 19' x 22', three-st'y flat; Edwin W. Archer, builder.

Bunker Hill St., No. 139, Ward 3, for Michael Kelley, dwell., 20' 9" x 36' and 11' x 22', three-st'y flat; Edwin W. Archer, builder.

Woodland Ave., rear, near Grampian Way, Ward 24, for Darius Wellington, mechanical and storage, 22' x 22', two-st'y hip; Augustus H. Nickerson, builder.

Lexington St., No. 237, Ward 1, for Paul Knowles, dwell., 23' x 55', two-st'y hip; Joseph M. Towles, builder.

Walnut Ave., No. 107, cor. Dale St., Ward 21, for Wm. Donaldson, dwell., 29' and 31' x 40', two-st'y pitch; Wm. Donaldson, builder.

Jamaica St., No. 100, Ward 23, for Catherine Downey, dwell., 22' x 29' and 13' x 16', two-st'y pitch; John Gately, builder.

Georgia Ave., rear, near Hartwell St., Ward 21, for Richard Addison, stable, 20' x 32', one-st'y pitch; Philip B. Kitner, builder.

Lexington St., No. 233, Ward 1, for Mary E. Hayes, dwell., 23' x 52', three-st'y hip; Joseph M. Towle, builder.

Holbrook St., near Eliot St., Ward 23, for Myrick G. Esterbrook, 2 dwells., 19' 6" x 29' and 16' x 25', two-st'y pitch; John Benedict, builder.

Brook Ave., near Dudley St., Ward 20, for Patrick Meegan, dwell., 22' x 32' and 15' x 16', two-st'y pitch; Edward H. Sawyer, builder.

Dudley St., No. 193, rear, for John D. Wester, storage lumber, 30' x 40', one-st'y flat; Edward H. Sawyer, builder.

Unnamed St., near Centre St., Ward 23, for Mrs. Caroline L. Lewis, 2 dwells., 30' x 31', two-st'y pitch; Holbrook & Harlow, builders.

Brooklyn.

BUILDING PERMITS. — *Elm St.*, s s, 114' 11" w Bushwick Ave., 3 two-st'y frame dwells., tin roofs; cost, each, $2,800; owner and builder, Frederick Herr, 778 Broadway; architect, Wm. Clement.

Willoughby Ave., s s, 100' e Tompkins Ave., two-st'y brownstone front dwells., tin roofs; cost, $3,500; owner, architect and builder, Richard C. Addy, 594 Willoughby Ave.

Lexington Ave., No. 71, three-st'y brick tenement, tin roof; cost, $4,000; owner and builder, Martin Byrne, 301 Greene Ave.; architect, A. Hill.

Greene Ave., n s, 75' w Stuyvesant Ave., 3 two-st'y brownstone front dwells., tin roofs; cost, each, $4,000; owner, Rev. A. S. Walsh, N. Y. City; builder, A. Miller.

Sixth Ave., n e cor. Union St., three-st'y brownstone front dwell., tin roof; cost, $15,000; owner, Mary Skelly, 205 Sixth Ave.; architect and builder, Andrew Hilson.

Thirteenth St., n s, 347' 10" e Fourth Ave., three-st'y brick tenement, tin roof; cost, $3,500; owner, architect and builder, J. W. Mount, 246 Eleventh St.

Buffalo, N. Y.

ARMORY. — Brick armory, Fremont Pl.; cost, $12,000.

CHURCH. — Delaware Ave. Baptist Church, brick and brownstone; cost, $25,000; architect, C. K. Porter.

PARK BUILDING. — Frame building on the Park grounds at the front, owned by city, waiting-rooms and refectory; cost, $10,000; architect, E. L. Holmes.

ROUND-HOUSE. — Round-house for Nickel Plate Road, South Buffalo; cost, $25,000.

STORES AND OFFICES. — Richmond Building, stores and offices, five-st'y, brick, brownstone and terra-cotta; owner, Jewett M. Richmond; architect, M. E. Beebe; location, cor. Elliott and Seneca Sts.; cost, $80,000.

Remodelling and additions to the Chapin Block, cor. of Swan and Erie Sts.; cost, $75,000; owner, Frank Hamlin; architects, Cankins & Co.

Brick and Ohio stone office building, Washington St., five-st'y; cost, $150,000; owners, Adams & Moulton; architects, Porter & Percival.

Drug-store and dwell., cor. Niagara and Jersey Sts., brick and brownstone; cost, $8,000; owner, R. K. Smither.

Chicago.

HOUSES. — Burling & Whitehouse, architects, have plans ready for a house for Mr. C. T. Yerkes, cor. of Michigan Ave. and Thirty-second St., brownstone front, hard-wood interior; cost, $60,000.

The same architects have on hand four houses, cor. of St. Clair and Ontario Sts., for Estate of Wm. B. Ogden. They will be of Chicago pressed-brick and terra-cotta, in Queen Anne style; cost, $60,000.

Mr. H. I. Cobb, of the firm of Cobb & Frost, architects, has planned a house for himself on the west side of Rush St., south of Superior St. The dimensions will be 25′ x 66′, four stories high, rock-faced brownstone, red slate roof.

WAREHOUSE. — Burling & Whitehouse, architects, have prepared plans for a four-st'y brick warehouse, 148′ x 150′, for the Empire Warehouse Company, at the cor. of Fulton and Clinton Sts.; cost, $55,000.

BUILDING PERMITS. — C. Barton, two-st'y brick store and dwell., 22′ x 68′, 402 West Huron St.; cost, $3,000.

Julius Zittel, three-st'y brick flats, 50′ x 70′, 641-643 Harrison St.; cost, $12,000.

A. L. Chetlain, three-st'y brick dwell., 23′ x 66′, 407 Dearborn Ave.; cost, $7,000.

M. Barts, two-st'y brick dwell., 20′ x 60′, 878 Twenty-first St.; cost, $3,000.

John A. Lend, three-st'y basement brick store and dwell., 42′ x 100′, Franklin St., cor. Ontario St.; cost, $20,000.

Ann Bright, two-st'y basement brick dwell., 21′ x 50′, 247 Loomis St.; cost, $4,000.

G. Sidlacek, two-st'y basement brick dwell., 21′ x 57′, 59 Fisk St.; cost, $3 400.

F. Prindiville, two-st'y brick dwell., 20′ x 60′, 110 Cornell St.; cost, $7,000.

E. Lane, three-st'y brick store and dwell., 24′ x 60′, 3614 State St.; cost, $4,500.

Hammill & Congdon, 3 three-st'y brick dwells., 50′ x 70′, 273-275 Lasalle Ave.; cost, $15,000.

Christian Reformed Church, two-st'y basement brick dwell., 22′ x 44′, 523 West Fourteenth St.; cost, $3,000.

Wm. Hunkel, two-st'y basement brick dwell., 22′ x 48′, 451 West Twelfth St.; cost, $4,500.

W. P. Smith, 6 two-st'y brick dwells., 45′ x 117′, Rhodes Ave., cor. Thirty-second St.; cost, $18,000.

Aug. Kuhn, two-st'y basement and attic brick dwell., 22′ x 50′, 151 Fowler St.; cost, $3,500.

Ryan Bros., three-st'y basement brick store and dwell., 25′ x 57′, 1199 Milwaukee Ave.; cost, $3,500.

Fred Krehm, 2 two-st'y basement brick store and dwells., 48′ x 80′, 484-486 Larrabee St.; cost, $11,000.

A. Kaiser, two-st'y brick dwell., 21′ x 60′, 148 Maxwell St.; cost, $3,500.

D. Lane, two-st'y basement brick dwell., 22′ x 70′, 402 Jackson St.; cost, $5,000.

James Dunn, brick market-building, 80′ x 150′, Clinton St., cor. Jackson St.; cost, $9,000.

Board of Education, three-st'y basement brick school-house, Ashland Ave., cor. Cornelia St.; cost, $42,0 0.

Jacob Rosenberg, three-st'y brick tenement-house, 77′ x 87′, Groveland Park, cor. Twenty-eighth St.; cost, $27,000.

Chas. Langman, one-st'y basement blacksmith-shop, 25′ x 58′; cost, $3,000.

E. H. Eilers, three-st'y brick store and dwell., 25′ x 40′, 274 Twelfth St.; cost, $4,000.

Wm. Buesman, two-st'y basement brick dwell., 21′ x 40′; cost, $3,400.

John M. Smyth, four-st'y basement brick store and theatre, 80′ x 100′, 150-156 Madison St.; cost, $50,000.

Lambert Tree and George M. High, five-st'y basement brick store, 80′ x 111′, cor. Lake and Lasalle Sts.; cost, $60,000.

C. J. Hull, four-st'y brick dwell., 63′ x 73′, Park St., cor. Ashland Ave.; cost, $18,000.

C. J. Hull, three-st'y brick dwell., 50′ x 100′, 31 South Ashland Ave.; cost, $18,000.

Campbell Bros., 6 two-st'y brick dwells., 36′ x 125′, 412-422 Leavitte St.; cost $18,000.

John Reddy, two-st'y brick dwell., 22′ x 50′, 3457 Dearborn St.; cost, $1,000.

Matt Farley, one-and-a-half-st'y brick cottage, 20′ x 43′, 302 Henry St.; cost, $3,500.

Cincinnati.

BUILDING PERMITS. — Herman Urban, three-st'y brick dwell., Ingleside Pl., Walnut Hills; cost, $15,000.

Fred. Trautman, three-st'y brick dwell., cor. Hackberry and Forrest Aves.; cost, $6,000.

Hubert Heuck, four-st'y brick stores and flats, Vine St., between Twelfth and Thirteenth Sts.; cost, $15,000.

George Krone, three-st'y brick dwell., Dandridge St., near Pendleton St.; cost, $5,300.

George K. Bartholomew, two-st'y brick building, Lawrence St., near Pearl St.; cost, $6,500.

Wm. Glenn, three-st'y stone front dwell., 367 West Seventh St., and 3 three-st'y brick dwells. on Barr St., in rear of above; cost, $15,000; Samuel Hannaford, architect.

G. J. Winall, 2 two-st'y brick dwells., Betts St., near Cutter St.; cost, $6,000.

George Holters, three-st'y brick building, Eastern Ave.; cost, $7,000.

Union Distilling Co., addition; cost, $4,000.

W. H. Firhmann, four-st'y brick store, 535 Central Ave.; cost, $15,000; Henry Bevis, architect.

W. F. Mitchel, two-st'y brick dwell., Richmond St., near John St.; cost, $4,000.

Owen Bros., three-st'y brick building, Court St., near Mound St.; cost, $8,500.

Fred. Schmidt, two-st'y frame dwell., Locust St., near McMillan St.; cost, $5,000.

M. Rosenthal, three-st'y stone front store, Fifth S., near Vine St.; cost, $8,000.

Three permits for repairs; cost, $3,000.

Total cost to date, $1,484,900,

Total permits to date, 389.

Denver, Col.

BUILDING PERMITS. — W. E. Wilson, brick dwell., Nineteenth St.; cost, $7,500; J. H. Littlefield, architect.

F. N. Davis, brick dwell., Grant Ave.; cost, $9,000; Nichols & Canmann, architects.

Rev. Geo. P. Hays, brick dwell., Washington Ave.; cost, $5,000; E. P. Brink, architect.

Public school addition, North Denver; cost, $12,000; Wm. Quayle, architect.

J. G. Thatcher, brick dwell., Sherman Ave.; cost, $10,500; F. F. Edbrooke & Co., architects.

Crescent Flouring Mill, 230′ x 150′, six-st'y, Stanton St.; cost, $30,000.

Hastings Elevator, Twelfth St.; cost, $30,000.

W. C. Lothrop, brick block, 90′ x 100′, three-st'y, Lawrence St.; cost, $50,000.

M. Benedict, brick dwell., Lincoln Ave.; cost, $10,000.

New York.

APARTMENT-HOUSE. — On the south side of One Hundred and Twenty-fifth St., 100′ w of Sixth Ave., a five-st'y apartment-house, 50′ x 100′, brick and stone, is to be built for Mr. E. H. Just, from designs of Mr. M. C. Merritt.

Three double apartment-houses, five stories high, covering ground 80′ x 125′, are to be built on West Seventy-eighth St., near Tenth Ave., from designs of Mr. O. P. Hatfield, at a cost of about $100,000.

BREWERY. — A five-st'y brick brewery, 36′ x 56′, is to be built on the north side of Eighteenth St., between Seventh and Eighth Aves., from designs of Messrs. A. Pfund & Son, to cost about $30,000.

CLUB-HOUSE. — The New York Athletic Club have purchased the property on the s w cor. of Fifty-fifth St. and Sixth Ave., 75′ 5″ x 100′, and will at once commence building a club-house, six stories high, of brick and stone, in the Gothic style, to cost about $200,000; Mr. H. Edwards-Ficken is the architect.

CHURCH. — The St. Nicholas German Roman Catholic Church propose erecting a church at Nos. 104 and 106 First St.

STORES. — Mr. Chas. C. Haight has been selected as architect for the store previously reported to be built for Messrs. Brooks Bros.' occupancy, on the s e cor. of Broadway and Twenty-second St. The building is to be 100′ x 100′, five stories high, brick and stone fronts, and will cost about $200,000.

A four-st'y and basement store, brick with Wyoming bluestone finish, 43′ x 60′, is to be built for Messrs. Morris B. Baer & Co., on the cor. of West Broadway and York St., at a cost of about $30,000, from designs of Mr. Jos. M. Dunn.

WAREHOUSE. — A two-st'y warehouse, brick and stone, 75′ x 113′, is to be built on Sixteenth St., w of Ninth Ave., for Messrs. Thos. McMullen & Co., at a cost of abont $45,000, from designs of Mr. A. Hatfield.

Fresh bids are being received for the large warehouse designed some time since by Mr. C. C. Haight, and to be built for the Trinity Church Corporation, on the east side of Greenwich St., running through from Vestry St. to Desbrosses St.; probable cost, about $200,000.

HOUSES. — For Mr. George Wood a four-st'y brick and stone house is to be built on Fifty-fourth St., adjoining St. Luke's Hospital, to cost $50,000.

For Mr. C. T. Barney a four-st'y brick and stone house, 27′ 11″ x 100′, to cost $80,000, is to be built on the s e cor. of Fifth Ave. and Sixty-third St.

For Mr. John S. Kennedy a fire-proof house, 30′ x 90′, with extension, is to be built; all three from designs of Mr. R. H. Robertson.

Six more houses are to be built for Mr. Ed. Kilpatrick, on the north side of Eightieth St., 209′ w of Madison Ave. They are to be brick and stone, four stories high, 15′ 8″ to 21′ x 67′; Messrs. D. & J. Jardine, architects.

OFFICE-BUILDING. — The four stores adjoining the old Stewart wholesale store, on Chambers St., are being torn down, and a new building is to be erected in conjunction with the old building, which is being improved and raised a story. The total cost of the improvements will be about $400,000.

ADDITION. — An addition is to be made to the house of Mr. J. Heron Crossman, No. 33 West Fiftieth St., from designs of Mr. A. H. Thorp.

BUILDING PERMITS. — *Second Ave., Nos.* 135 *and* 137, three-st'y brick dispensary and library building; also, one-st'y brick laboratory, tin roofs; cost, total, $75,000; owner, Oswald Ottendorfer, 7 East Seventeenth St.; architect, Wm. Schickel.

One Hundred and Fifty-second St., n s, 232′ w Third Ave., three-st'y frame tenement, tin roof; cost, $4,500; owner, Peter Killian, One Hundred and Fifty-second St. and Third Ave.; architect, A. Janson; builders, Janson & Jaeger and F. Wagner.

Philadelphia.

FACTORY. — L. M. W. Lippen, Esq., proposes to erect a six-st'y factory building, 60′ x 100′, on Garden St., above Wood St.; J. K. Yarnall, architect.

ACTIVITY IN BUILDING MATTERS. — The very large increase of permits in the last two weeks, for the erection of dwellings, indicates the manner capital is seeking investment as spring opens; between three and four hundred permits having been taken for dwellings alone, and most of them for attractive and commodious buildings; and all available ground is rapidly being appropriated for such purposes.

BUILDING PERMITS. — *Second St., No.* 111, four-st'y store, 12′ x 42′; Thos. Holt, owner.

Watts St., e s, n Federal St., two-st'y dwell., 16′ x 28′; W. E. May, owner.

Clarion St., w s, s Federal St., two-st'y dwell., 16′ x 32′; W. E. May, owner.

Tasker St., s s, bet. Dean and Griffith Sts., 2 two-st'y dwells., 15′ x 42′; Thos. P. Twibill, owner.

Philip St., No. 2053, two-st'y dwell., 12′ x 36′; Henry Dental, owner.

Cambria St., n s, e C St., 2 two-st'y dwells., 14′ x 28′; Wm. Rowson, owner.

Otis St., n s, e Front St., two-st'y stable, 16′ x 90′; Wm. Steel, contractor.

Leiper St., w s, n Arrat St., three-st'y dwell., 29′ x 93′; Wm. Keas, contractor.

Twenty-fourth St., w s, s Reed St., 3 two-st'y dwells., 16′ x 28′; Wm. Forbes, owner.

Bailey St., s s, w of Twentieth St., two-st'y dwell. and two-st'y stable, 17′ x 40′ and 16′ x 25′; Wm. Davison, owner.

Madison St., n and s s, bet. Emerald and Jasper Sts., 12 two-st'y dwells., 15′ x 44′; D. Trainor, contractor.

Mifflin St., n e cor. Otsego St., one-st'y store-house, 45′ x 58′; Edward H. Rowley, owner.

Twenty-second St., e s, s Sansom St., four-st'y dwell., 22′ x 75′; Chas. D. Supplee, contractor.

Christian St., n s, w Broad St., 3 three-st'y dwells., 18′ x 60′; Jno. Loughran, owner.

Sepviva St., s s, e Norris St., two-st'y dwell., 17′ x 52′; Chas. Martin, contractor.

Hope St., n w cor. Montgomery St., one-st'y building, 30′ x 60′; Jas. McCartney, contractor.

Birch St., n e cor. Edgemont St., two-st'y dwell., 20′ x 32′; Jno. Mitchell.

Chester Ave., e s, bet. Forty-seventh and Forty-eighth Sts., 4 three-st'y dwells., 18′ x 49′; Jas. D. Arthur, contractor.

Twenty-fourth St., w s, bet. Wright and Sharswood Sts., 6 two-st'y dwells., 15′ x 52′; J. M. Sharp, owner.

Fitzwater St., n s, w Eighteenth St., three-st'y dwell., 15′ x 42′; W. Sweeney, owner.

Tacony St., n w s, s Bridge St., three-st'y dwell., 16′ x 28′; J. S. Taylor.

Mascher St., e s, n of Dauphin St., two-st'y dwell., 18′ x 46′; S. R. Stewart, contractor.

North Front St., No. 2419, two-st'y wheelwright shop, 16′ x 54′; Amelia Kershaw.

Orkney St., w s, s of Cumberland St., two-st'y dwell., 18′ x 28′; Robert McNeill, owner.

Forty-second St., Nos. 831 *and* 833, 2 two-st'y dwells., 15′ x 42′; E. J. Lynch, contractor.

Shawmut Station, R. R. Road, two-st'y dwell., 18′ x 38′; Josiah Bickings, contractor.

Twenty-second St., w s, 281′ n of Montgomery Ave., one-st'y chapel, 30′ x 53′; O. A. Bartholomew.

Fifth St., cor. Cumberland St., store and dwell., 20′ x 60′; Wm. Smith, contractor.

Elmwood Ave., e s, bet. Seventy-first and Seventy-second Sts., three-st'y hotel, 40′ x 40′; Albert Fox, owner.

Vine St., Nos. 5526 *and* 5528, 2 two-st'y dwells., 12′ x 57′; Wm. D. Kunkle, contractor.

Reed St., No. 1808, two-st'y dwell., 16′ x 41′; Jos. McKeever, owner.

Thirty-second St., e s, s Spring Garden St., 13 three-st'y dwells., 16′ x 52′; Elkins & Peters, owners.

Church Lane, s s, bet. Greenway and Kensington Aves., two-st'y dwell., 14′ x 30′; Harry Paschall, owner.

Nicholas St., n and s s, 56 three-st'y dwells., 15′ x 44′; Jas. E. Dingee, owner.

East York St., No. 618, three-st'y dwell., 16′ x 62′; Wm. Bartholomew, contractor.

Leiper St., s w cor. Orthodox St., 2 three-st'y dwells., 24′ x 34′; Wendell & Smith, contractors.

Leiper St., cor. Allen St., three-st'y dwell., 34′ x 36′; Wendell & Smith, contractors.

Suydenham St., No. 1709, three-st'y dwell., 17′ x 53′; Jacob E. Ridgeway, owner.

Cumberland St., s s, w Fifteenth St., 8 two-st'y dwells., 15′ x 41′; W. H. Lower, contractor.

Garfield St., n s, bet. Germantown Ave. and Wakefield St., 4 three-st'y dwells., 13′ x 88′; C. Ancopp, contractor.

East Chelten Ave., n s, w Magnolia St., four-st'y factory, 57′ x 172′; F. W. Wright & Son.

Nevada St., No. 1037, two-st'y dwell., 16′ x 41′; G. N. Hart, contractor.

Christian St., n s, e Fifteenth St., 4 three-st'y dwells., 18′ x 65′; Robert Russell, owner.

Caerveson St., w s, bet. Dickinson and Tasker Sts., 11 two-st'y dwells., 14′ x 28′; Thos. Grinnan, owner.

Chestnut St., Nos. 122 *and* 124, five-st'y addition to front building, and five-st'y back building, 30′ x 59′ and 39′ x 74′; J. Bradin, contractor.

Twenty-fourth St., n e cor. Christian St., three-st'y store and dwell., 17′ x 50′; Chas. Lafferty, owner.

Juniper St., n e cor. Wynkoop St., two-st'y stable, 36′ x 56′; Nathan Meyers, owner.

Thompson St., s s, e Twenty-fourth St., 2 two-st'y dwells., 15′ x 51′; J. H. Lyons, owner.

Berks St., s e cor. Croskey Sts., 5 two-st'y dwells., 15′ x 47′; James Caven, owner.

Seventeenth St., s w cor. Vine St., two-st'y stable, 20′ x 31′; Theo. E. Sheldrake, contractor.

McCullum St., bet. Carpenter St. and Mt. Pleasant Ave., two-st'y dwell., 16′ x 37′; M. Hetzel, contractor.

Filbert St., Nos. 1227 *and* 1229, five-st'y hotel building, 44′ x 106′; Jas. M. Wells, contractor.

Twenty-seventh St., s e cor. Columbia Ave., store and dwell., 17′ x 57′; John Maylin.

Wilder St., s w cor. Eighteenth St., 2 two-st'y dwells., 17′ x 43′; Peter Sheets, owner.

Mascher St., No. 2403, two-st'y dwell., 18′ x 54′; Wm. Schoenleber, contractor.

Venango St., s s, 20′ w Janney St., two-st'y dwell., 14′ x 30′; Daniel Trainor, contractor.

Sharp St., w s, n Adams St., two-st'y dwell., 18′ x 34′; McIlvain & Cunningham, contractors.

Cresson St., e s, s Adams St., two-st'y dwell., 18′ x 32′; McIlvain & Cunningham, contractors.

Seventh St., e s, 18′ n Pierce St., two-st'y dwell., 15′ x 44′; Thos. B. Twibill, attorney.

Bainbridge St., No. 1931, three-st'y dwell., 18′ x 43′; Jessie Wills, owner.

Sixth St., w s, n Somerset St., 2 two-st'y dwells., 18′ x 36′; J. S. Baldt & Son, contractors.

Otto St., No. 161 (Germ.), two-st'y dwell., 18′ x 44′; E. Welsh, owner.

Eleventh St., w s, n McKean St., 11 two-st'y dwells., 16′ x 40′; B. Harvey, owner.

Locust St., No. 610, three-st'y factory, 20′ x 50′; Geo. W. Payne, contractor.

Reese St., w s, n York St., 12 two-st'y dwells., 14′ x 47′; A. F. Richards, contractor.

Eighteenth St., n e cor. Tasker St., two-st'y dwell., 18′ x 47′; Geo. Estlack, owner.

Belt St., e s, s Baring St., 2 three-st'y dwells., 12′ x 30′; Thos. C. Sloan, contractor.

Van Pelt St., w s, n Berks St., 5 two-st'y dwells., 14′ x 44′; J. R. Pyle, contractor.

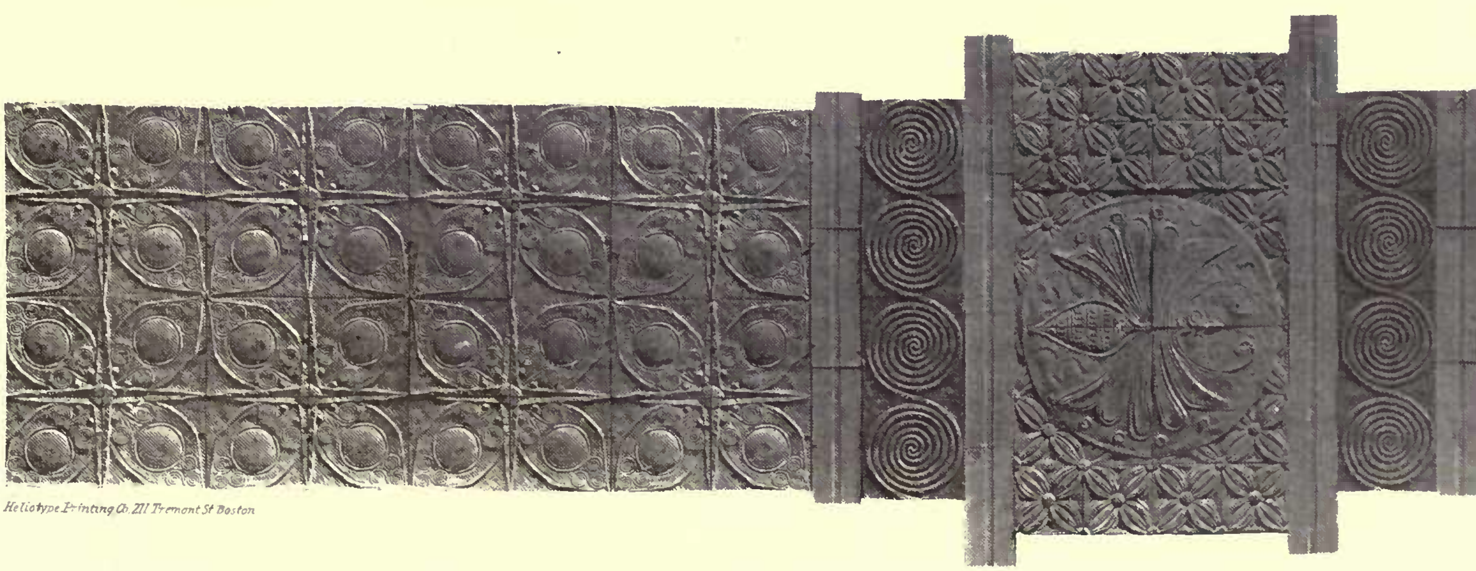
Tioga St., s s, e Edgemont St., two-st'y dwell., 16′ x 32′; M. Donahue, owner.

Fifteenth St., n e cor. Mt. Vernon St., 13 three-st'y dwells., 20′ x 74′; J. M. Sharp, owner.

Section of Frieze in Private Residence, Ithaca, N.Y. Drawing Room.

A few new designs.

Section of Wall, Private Residence, Chicago, Ill.
Smoking Room.



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THE investigation into the mode in which the present Supervising Architect of the Treasury Department has administered his office seems to have assumed the character of a costly farce. Notwithstanding the dark predictions and sweeping denunciations thrown out months ago by the principal accusers, nothing definite has been submitted to the investigating committee; and one of the most active promoters of the inquiry has been obliged to demand access to all the records of the Architect's office, in order, as it seems, to search for some evidence to substantiate his own assertions. The other reforming enthusiast appears to have found his ardor a little damped on learning that the archives of the office over which he once himself ruled were to be overhauled in the pursuit of scandals, and has discreetly withdrawn himself from obvious participation in the proceedings. Meanwhile, the public business suffers, while the officials designated for service on the investigating committee wait for the presentation of the first item of that overwhelming mass of evidence which was said months ago to be ready for them.

A SINGULAR dispute is going on in Philadelphia in regard to the propriety of taxing pictures and statuary contained in the residences of their owners. It would seem that in that city household furniture is subjected to a separate valuation by the assessors, and is taxed by itself, and the assessors very naturally think that the pictures hung on the walls of the houses they visit, or the statues set up in the bay-windows constitute a part of that furniture which, as their instructions say, "contributes to the use or convenience of the householder, or the ornament of the house." The proprietors of these objects, many of whom, probably, have more money invested in them than in all the remainder of their house and furniture together, find the tax a serious one, and would be glad to avoid it. A meeting of such persons was held a few days ago to consider the question, and the problem which seemed likely to lead to a serious conflict between the taxpayers and the assessors was solved, as it would appear, by a most ingenious invention. The directions which the assessors are obliged to follow contain, as we have seen, a definition of furniture as something which contributes to the use or convenience of the householder or the ornament of his house; but it is evident that if pictures or statues are not used to ornament the house, but are simply stored in a detached room, called an art-gallery, or some such name, they do not fall within the assessors' definition, and are therefore not taxable. In the interest of the peace of Philadelphia, we trust that this logic will be held good, and advise architects who may intend to practise in that city to remember that if it should prevail an "art gallery" for the reception of objects to be exempted from taxation, will be required in every respectable household.

THE American painters and sculptors resident in Italy have joined their fellows in France in protesting against the discriminating duty upon works of art by foreign artists imported into this country. It is a little singular, though not unnatural, that our artists living abroad seem, without exception, to forget about the pecuniary benefit which the increase in the tariff was intended to confer upon them at the expense of their patrons, in their indignation at the want of appreciation shown by the legislature of their native land, which thrusts out, as it were, its long arm to hoist them out of the poverty and degradation in which it assumes that they must be living. It is certainly creditable to the whole profession of art that so decided a stand should have been taken upon the subject, and we are sure that those who have been instrumental in drawing up and signing the various memorials will in the end find that they have raised themselves and their country in the estimation of their foreign rivals by their generous independence. Meanwhile, the prospects of the great Boston Foreign Exhibition, which is to open next September, are said to have been seriously affected by this, as well as the other provisions of the new customs tariff. It is obvious that no maker of fine goods will trouble himself to send samples of them to a country which openly proclaims its determination to prohibit him from selling any of them; and the exhibit of foreign manufactures in any of the so-called protected classes may well be insignificant.

THE recent annual address of the president of the National Board of Fire Underwriters presents, as usual, many interesting facts. It appears that the past year has been an unprofitable one for the insurance companies, which will surprise no one who remembers the low rates of premium which have prevailed in many places; but it seems also that, contrary to the belief of most persons, the character of buildings with respect to security from fire has deteriorated, the percentage of loss to insurance having been about thirteen per cent greater last year than in 1874. A few feeble attempts seem to have been made by the companies to reach some of the causes of the increasing destruction of the property which they have to pay for, and fourteen thousand dollars has been expended in convicting and punishing incendiaries, but there are no signs of any general awakening of underwriters to the fact that they themselves are principally answerable for the losses over which they lament so loudly; and that the flimsy modes of construction now in use, for which they blame architects so unjustly and industriously, would be modified more quickly and effectually at a word from them than by the combined influence of the whole architectural profession.

THE claim made by two army officers upon the tract of land including the Nutria Springs, upon which the Indians of the pueblo of Zuñi are said to depend for their principal water supply, is to be pressed, notwithstanding the recent proclamation of President Arthur by which the springs were declared to be included in the Zuñi reservation. According to the claimants, the Zuñis can get all the water they need without going to Las Nutrias, and they visit the large springs for their own enjoyment, but not from necessity; and under these circumstances they think that they are entitled to the property. They have on their side the advantage of being supported by a politician of great influence in Washington, while the Indians are not represented at all; but it is to be hoped that justice, and, if possible, more than the usual Indian-Department justice, may be shown to this peaceful and virtuous little community of men, women and children, whose kindred have for so many centuries cultivated by their labor, and defended with their lives, the territory of which civilized rapacity can now spare them at the best but a small portion.

THE subscriptions to the fund for constructing a pedestal for the great statue of Liberty come in slowly, and it is announced that about one hundred and fifty thousand dollars remain to be raised. There is some complaint of the inaction of the committee in charge of the work, and the opinion is generally expressed that an appeal ought to be made at once to the richer men of New York. There is, however, something to be said in favor of the plan which the committee apparently has in view, to secure as many small subscriptions as possible,

before resorting to the richer men to make up the balance required after their equally patriotic, but less wealthy fellow-citizens, have done all they can. Several modes have been suggested for obtaining contributions from the poorest classes, by placing boxes in the post-offices throughout the country, in the ferry-houses, at the entrances of the great Brooklyn bridge and elsewhere, and entertainments will undoubtedly be held in various places for the benefit of the fund. All these will help to swell the total, and as the committee, under the new arrangement, have still a year before them for collecting money, there can be little doubt of their success.

AN ingenious, and, as it would seem, intelligible mode for laying underground electric wires has been patented, and is soon to be put in practice. Every one knows that the great obstacle to the use of underground wires is found in the resistance and interference of the induced currents which each electrified wire sets up in every conducting substance near it; and many attempts have been made to overcome the effect of this induction, but without much success. By using a double wire, so that the current runs entirely around a metallic circuit, instead of returning through the ground to the starting point, the primary and induced currents neutralize each other, and the line is secure from interference; but this remedy is too expensive for common use. By treating the whole system of electric wires in a single street under a comprehensive scheme the inventors of the new method are, however, able to secure the advantage of a metallic circuit to a considerable number of single wires at once. In their project the electric-light wires, which carry the most intense current, are made the chief factor in the group, each street being furnished with two such wires, one running through it on one side, while the other returns on the opposite side, the whole forming a complete metallic circuit, such as is usually employed for electric lighting. Between the electric-light wires are laid the telephone wires, not twisted into a cable, but placed one-quarter or one-half an inch apart in a water-proof trough. This trough, instead of continuing in a direct line along the street, has the peculiarity of crossing it at short intervals from one side to the other, bringing the wires which it contains within reach of the induction from the electric-light wires on each side. As the current in the latter passes in one direction on one side, and in the reverse direction on the other, the current induced by it in the telephone wires changes in direction at each transfer of these from one side of the street to the other, and the opposite induced currents in each single wire, being of equal force, neutralize each other, leaving the line as free from interference as if it presented a full metallic circuit. The telegraph wires, for which perfect freedom from induction is not so necessary as in the case of the telephone, are to be laid straight through the streets, each group, however, being furnished with a common return wire of sufficient capacity to balance the united currents of the direct wires.

LE GENIE CIVIL gives in its last issue an account of the great viaduct of Garabit, which is now on the point of completion in the southeastern part of France. The viaduct is owned by a company which is engaged in building a railway between Marvejols and Neussargues, two towns of some importance about a hundred miles from Avignon. A river separates the two places, which are built on high plateaus on each side of the valley, and as first laid out, the railway was intended to descend from the plateau on one side by a long grade, following the course of a small tributary of the river, until it reached the bottom of the valley, then, crossing the river, to return by another gradual ascent up the course of a second tributary flowing in from the other side. This appeared, under the circumstances, to be the only practicable mode of joining the two banks of the valley, and it was not until after a thorough study of the problem that M. Boyer, the young engineer in charge of this portion of the line, resolved to advise his principals to change their scheme for the much bolder one of building a line directly across the ravine. Nothing quite so daring had ever been attempted in railway construction, but the famous bridge built by M. Eiffel across the Douro in Portugal, although of smaller dimensions than would be necessary for the present one, had proved perfectly successful, and the officers of the company were easily persuaded to hazard an experiment which would, if carried out, give them a much better line than their first plan, and at a cost nearly, if not quite, a million dollars less.

THE construction used for the Douro bridge was adopted in its main features for the other. The deepest part of the valley, including the river-bed, is crossed by an enormous iron arch, five hundred and thirty-six feet in span, and four hundred and sixteen feet high, which carries the lattice-girders of the railway, supported partly on the crown of the arch, and partly on open iron towers carried up from the haunches. Beyond the arch on each side the construction is continued by towers of iron lattice, standing on piers of masonry, and forming at the top a level bearing for the girders, which extend to a length of about a third of a mile. The roadway is carried by a double line of lattice-girders, from one hundred and sixty to one hundred and eighty feet in span, and consisting of iron Howe trusses seventeen feet deep, well braced against wind, and stiffened also by a solid iron floor, inserted about five feet below the top of the upper chords to carry the track, which is thus walled in by the girders in such a way as to render it impossible for a train to fall from the viaduct. Under the floor carrying the main rails is another track, supported from the lower chords of the girders, on which will run hand-cars carrying the men and materials needed for keeping the structure in proper condition. As will be seen by comparing the figures, the Garabit viaduct is more than a hundred feet higher than the wooden Kinzua viaduct, now in process of construction in Pennsylvania, which has been called the highest in the world; but *Le Génie Civil*, in calling attention to this fact, suggests at the same time a wholesome lesson in modesty, by reminding us that no modern work of the kind has yet approached in dimensions the viaduct of Spoleto in Italy, built in the sixth century by Theodoric, the king of what we are pleased to call a nation of barbarians, which still, after the lapse of thirteen hundred years, carries the traffic of the town as well as ever, at an elevation, according to one authority, of six hundred and fifteen feet above the bottom of the ravine which it crosses.

ALMOST every one has heard something about the admirable effect of the balsamic emanations of the eucalyptus tree in neutralizing or destroying the poison of malaria, and many persons know something of the experiment undertaken at Tre Fontane, in the Roman Campagna, by a body of Trappist monks, who planted a grove of eucalyptus in a region renowned for its unhealthfulness, and in its shelter established a convent where experiments in draining and cultivating the territory were carried on with great success. The exemption of the monks from the ordinary malarial affections of the district attracted much attention, and in 1880 a penal colony was established by the Italian Government at Tre Fontane, close to the Trappist convent, with the express purpose of extending the eucalyptus plantations, and seconding the work of the ecclesiastical pioneers. During the first two years sporadic cases of malarial fever occurred among the Government colonists, but these were attributed to infection extending from the neighboring country; the land protected by the new drains and the eucalyptus groves being looked upon as quite safe. In 1882, however, a rude shock was given to the confidence which had grown up in the success of the Trappist experiment. That year was a very dry one, and the cold weather of autumn came on early, so that the Campagna in general was remarkably free from malarial disease, and such cases as occurred were also unusually mild. One locality only formed an exception to the rule, and this locality was Tre Fontane, where every person was attacked by fever, not one escaping either in the monastery or the Government colony. Among the Trappists, who lead very wholesome and well-regulated lives, the cases were mild, but many of the convict colonists and their guards were seized with the "perniziosa," and only escaped death by immediate transfer to a purer atmosphere. This exceptional outbreak in the very place which was regarded as permanently secured against such dangers excited much attention throughout the country, and a commission of physicians and engineers has been appointed to inquire into the cause of it. Meanwhile evidence is accumulating from other sources to the effect that the aroma of the eucalyptus tree is much less efficacious against malaria than has been supposed. From Australia, where the tree grows wild, it is reported that ague is particularly common in the midst of some of the eucalyptus districts, and in Algeria it has proved of little service.

SEWAGE DISPOSAL FOR ISOLATED HOUSES.—II.

THE article on this subject published on page 219 may properly be supplemented with specific information as to certain details of the work.

This system may be made to operate almost equally well in soils of very different character, very heavy clay and pure peat being the least favorable and light sandy or gravelly loam being the best. The quality of the soil, aside from its purifying efficiency, has much to do with the length of absorption drain required. In a light soil the sewage runs freely out of the pipes, making way quickly for the flow that is to follow. In very porous sand or gravel, even in the case of a small system where the time occupied in the delivery of the contents of a flush-tank to the extreme ends of the drains is very short, probably a length of drain of fifty feet would take care of one hundred gallons of sewage before a sufficient head would be brought to bear upon it to force it to the surface of the ground — which, of course, is to be avoided. In a very stiff clay, on the other hand, where the sewage would escape through the joints very slowly, it might be prudent in small systems to use a length of three hundred feet or more for the same amount. In what may be called *average* soils, in the construction of small works for single families, an allowance of two hundred feet for one hundred gallons seems to answer very well. It is always well to bring a little "head" to bear on the contents of the pipes to ensure their being filled at every point. In very stiff clays it is well to fill the trench from the bottom of the gutters to above the tops of the caps with sand or gravel to hasten the discharge.

Perfect drainage of the soil is most indispensable, and if the land is not naturally dry it must be thoroughly underdrained. Where underdraining is necessary, the perfect settling of the filling over the underdrains must be secured by the equivalent of at least two or three drenching rains before it is safe to lay the absorption tiles across the lines of the trenches.

It has been a matter of surprise to all who have had experience with this system that the most severe frost seems to have no effect upon its working. In my own grounds, where the absorption drains were five feet apart, the ground between them has been frozen to a depth of three and one-half feet, yet the warmth of the sewage was always sufficient to secure its entrance into the soil.

One of the most frequent questions asked in connection with this system is "What becomes of the sewage?" All porous substances seem to possess the power of extracting impurities from water which passes through them. The upper layers of the soil possess this power in a peculiar degree. When a flood of sewage escapes from the joints of absorption drains it is soon deprived of its burden of organic matter, and settles away into the ground in a purified condition. The organic matter thus retained by the soil — and which, if delivered into its lower strata beyond the reach of air and of vegetation, would accumulate and render the earth foul — is, when deposited near the surface, rapidly oxidized, and in the growing season taken up by the roots of plants. Therefore, when sewage is delivered into a network of absorption drains by the intermittent discharge of a flush-tank it escapes through the joints into the ground; its water settles away leaving its impurities attached to the surfaces of the particles of the soil. These impurities are probably all destroyed during the interval between two discharges. Certain it is that the soil, even that close to the joints, fails to become foul, or to become in any way distinguishable from the soil of other portions of the field at the same depth after years of use.

It may be worth while to say a further word concerning the atmosphere of the settling-chamber which is, in a certain sense, a permanent cesspool. This air cannot fail to be made foul by the decomposition of the sewage there retained, but the frequent renewal of the small volume of sewage reduces this difficulty to the minimum. It seems important, however, to avoid the exposure of porous brick walls to such an atmosphere. A porous surface so exposed is especially favorable to bacterial growth. To avoid possible objection from this source the extension of the settling-chamber from the permanent level of the water to the surface of the ground is constructed of large vitrified pipes having a glazed and non-absorbent surface. It is desirable to remove the deposits of the settling-chamber from time to time—as observation may show to be necessary. No rule can be fixed as to this. In some cases the decomposition is so complete that the chamber never accumulates much deposit. In others it should be cleaned out monthly. The proper relation between size of chamber, amount of water discharged, and proportion of foreign matter in the water cannot be fixed in the present state of experience or with the apparatus.

Another question of much interest is *the cost of the work.* It is possible to construct a disposal system on the principle here set forth for little more than the cost of a good cesspool; but it is a case where parsimony is to be deprecated. There is nothing more important to the sanitary condition of an isolated residence than the perfect disposal of its organic wastes. It is conceded on all hands that the common cesspool has irremedial sanitary defects. The system that has been here described offers a perfect solution of this question — but perfect only when executed with the greatest care and the closest attention to details.

It should be repeated that however completely the system may be carried out, obstructions will from time to time occur in the drains. These will be indicated by a cessation of the growth of the grass at and beyond the point of obstruction. It is the work of a moment to uncover the drain, lift a few pipes, remove the obstruction and relay them on the permanent grade established by the gutter tiles, which themselves need never be disturbed.

It is proper to say that the flush-tank used for this purpose and many details connected with its construction and arrangement are protected by patents. GEORGE E. WARING, JR.

FROM BAYREUTH TO RATISBON.—NOTES OF A HASTY TRIP.—VI.

TO any of my readers who have been art-students in Munich, Rothenburg will be a thrice-familiar name, and architectural students will perhaps remember to have seen its buildings cited in their books, though they are not among the most famous or most remarkable of German structures; but to all others the name of Rothenburg will be unknown — and this to a degree which seems inexplicable when we realize the interest of the place. Though it lies so near one of the great highways of travel — only an hour or so off the main track we are now pursuing between Würzburg and Nuremberg, and within three or four hours' easy journey of this latter place — it is not many years since even the enterprising Munich art-student did not know of its existence. Its long obscurity is one of the most interesting and anomalous facts of which I know. Founded in the very earliest days of which even German legends tell, rising soon to the rank of an important border fortress and later to be one of the greatest cities of Franconia and finally to the rank of a free imperial town; the residence of some of the most famous among German families; the centre of many a thrilling historical tale; one of the chief battlefields in the terrible Peasant War of the sixteenth century and one of the most constantly recurring names in the Thirty Years' War as well; a town for very many years second only to Nuremberg herself in all South-Western Germany, both politically and commercially considered — this Rothenburg, which had played its part in the very front rank of history for centuries together, fell in the last century into complete stagnation first, then into complete isolation, and finally into an oblivion so entire that very few of the architects, explorers, and art-lovers of Germany even, knew any more of its existence than that it was still a name upon the map. For myself I may say that I had never heard of any one going there from Dresden, where I had lived a number of years, until this, my last visit to the Fatherland. I then heard it spoken of for the first time and what seemed to me very wild tales told of its attractions. I asked why they had never been sung before and was told the town had been so completely forgotten by the world at large that when an officer who had passed through it during the Franco-German war reported what he had seen to the art-students of Munich, they heard his story with incredulity. So close at their doors, so unique in its condition, and yet so utterly ignored — the thing seemed an impossibility. But one of the most enterprising — of course an American — ran up to have a look at it, and since that time a constant stream of Munich students has swarmed thither every summer, and every tag and scrap of antiquity it shows has been drawn and painted over and over again and introduced into compositions of the most varied sorts.

This was nearly fifteen years ago and there was then no railroad to Rothenburg. Eight years ago, however, a little branch road was built. It still ends at Rothenburg, and its rolling-stock consists of but a few freight cars, a third-class coach, and a luggage van with a single second-class compartment, holding six persons, attached thereto. These run alternately from one point to the other on the single track. From these details it may be seen that the town is not yet a resort of German tourists, still less of foreign cockneys and "Cookies." To us to-day it seems an almost absolute oasis of antiquity in our modern world, almost absolutely untouched by the hand of the renovator, and, I had nearly said, by the hand of Father Time himself; but the lamenting Municher—the American painter Rosenthal who glories in the proud title of "Discoverer of Rothenburg" — tells a different tale. He says it is now "quite modern" as compared with its condition fifteen years ago, when all the walls were standing, when no stranger trod its streets, and when *not a single house* was nearly as young as the century. Yet even after listening to such plaints one is quite satisfied with what one finds — the completest picture in all Germany of an unaltered ancient town, undis-

turbed by the busy current of modern life or the prosaic touch of recent builders. Something has been destroyed but the stranger hardly misses it, and the little that has been put up — chiefly a small factory or two, outside the walls —is most inconspicuous; the inhabitants have to some extent abandoned their primitive costume but it still blossoms out on Sundays and holidays; and even the railway stops at its little station half a mile away from the gates. Visitors even now are rare, outside of the bands of artists who throng the little inns in summer and plant their camp-stools on every street corner and every external point of view. No one else appears save a rare German art-lover of non-tourist-like appearance. From the interest with which we were regarded on every hand when our nationality was discovered we drew the conclusion that we were the first American ladies who had ever burst upon the horizon of the town. Did my readers imagine that such a city existed this side of the Tartar steppes? The artists, however, — Rothenburg is one place where such are duly honored in public opinion, — who were at first asked with much curiosity what they could find to rave about in this dead old place, have at last infused a sense of his own importance into the mind of the Rothenburger. He is now very proud of his town and almost comically conscious of its pictorial resources; but whether this consciousness will be sufficient to lead him to keep it intact and to resist the current of modern innovation which is just encroaching upon his long-isolated domain, is a question. How many years will it be, one wonders, before Rothenburg will again take her place among the busy modern cities of Bavaria, or at least before her ancient relics will, instead of standing as they do now, unconcealed by later additions, be swamped and overlaid by nineteenth-century improvements and desecrations? The native may possibly— not unnaturally, indeed — grow to feel that he may have some rights and privileges as a citizen of modern industrial Germany, and should not be expected to exist in his provincial poverty and isolation as a mere conservator of the treasures of past days for the benefit of Munich art-students and trans-atlantic tourists. At all events it will be wise for those who want to see a town that is not only most beautiful in itself but doubly interesting as being the most perfect existent picture of a German city of past centuries, to make his pilgrimage to Rothenburg without delay. If he waits many years he will find perhaps an altered city or, if not, at least a crowd of Philistine tourists, the absence of whom to-day is not the least of Rothenburg's unique attractions.

One leaves the main route at the little station of Steinach and approaches the town from the east over a flat table-land which gives no hint of the actual situation of the town. This is the least interesting view of the place and he is fortunate who makes the journey at night, to wake in the morning in the very midst of its attractions. For the plain is cut by a deep, narrow, winding valley, with a little river at the bottom. On the east the bank rises high and steep some two hundred feet above the vale, and right on the edge of the declivity stands "Rothenburg on the Tauber" as we should say, "*an der Tauber*" as the average German would say, but, as the Rothenburger says in his quaint parlance, "*ob*" or "*above* the Tauber." The cliff runs out so sharply and in such broken lines, with such a diversity of projections and retreats that the town built along its edge stands as it were on a promontory with many little capes looking down on the exquisite valley and on the low rolling hills which rise again farther to the west. All along the edge runs the ancient wall, broken by many turrets and larger towers, and the houses are immediately behind it; — above it, even, for the wall itself often forms a part of their foundations. As seen from the valley below or from the opposite hills the view is unequalled, I think, in all Germany — looking more like the background in one of Albert Dürer's prints than like any other actual panorama we can find. The gray wall with its queer turrets, surmounted now by masses of foliage, now by red-roofed houses, is backed by the farther houses of the town which climb the somewhat hilly streets, and by the huge round or square masses of the many mediæval gateways; while above all, on the highest point rises the large late Gothic church of St. Jacob finished with two fine though not very lofty spires and forming an admirable crowning to the whole. Nowhere, neither in the town above nor in the valley below, is there the slightest trace of the modern builder to be seen—such works of his as do exist standing, as I have said, on the other, eastern, side of the town. Toward the south a road winds steeply up the hill and at its foot is a beautiful little Gothic church just by the bank of the stream, and near this a most picturesque stone bridge, built in the fourteenth century, with two superimposed rows of round arches.

Toward the other end of the town the cliff runs out into the longest and narrowest of all the tongues with which its line is broken. Here was the first beginning of the city, and here the ancient *Burg* which was built according to trustworthy evidence, in 419, though the settlement and first fortification of the spot had taken place nearly a hundred years before. This old tower called the "Dicke Thurm" or "Pharamund's Thurm" actually stood until the beginning of our own century when it was pulled down by the Bavarians when they took possession of the province. One has, by the way, a poor opinion of these Bavarian rulers, who almost at the time when they were striving so hard (and so unsuccessfully) to beautify Munich and make it "the modern Athens," allowed their deputies to pillage and what is still more inexcusable, to wantonly injure the wonderful old monuments which they had just stolen from their local rulers. It might not strike a visitor to Rothenburg to-day that there could ever have been any wholesale work of destruction organized in Rothenburg — so full are its streets of countless relics of the past; yet the records show that such was indeed the case. Not only were all the movable works of art appropriated — and the treasures of church and town-hall in this flourishing independent city were very rich and very varied — but a large number of its finest buildings were pulled down without the shadow of an excuse. The oldest buildings within the Burg were removed, including the open stone pavilion where the imperial justices had sat in the old days before the city became a free imperial town in 1397; and most of the moat between the Burg and the town was filled in. Besides this, four of the most beautiful churches were ruthlessly destroyed. One, a small pointed structure which stood free in the square near the *Jakobskirche* seems to have been the finest work of architecture of which the place could boast. Its stones were used in building the highways or were sold for the most trifling sums; and only the liberality of one of Rothenburg's citizens preserved the exquisite little church in the valley — not only beautiful in itself but the most striking object in the western view of the town — from sharing the same fate. It is no wonder that even to-day — especially, perhaps, to-day when he has just been awakened to the value of his treasures and a keener sense of his losses — the Rothenburger resents being called a Bavarian. He is a German, and, if he must have a province, a Franconian; but above all he is a *Rothenburger* — a (once) free and independent burgher of a (once) free and independent imperial city.

This is not the place to tell in detail the tale of Rothenburg's history — though a knowledge of it is most important to a full enjoyment of one's visit. It will be found briefly recited in an excellent hand-book to the town, which gives also much definite and reliable information about its architectural antiquities, written by a local antiquary, Herr Merz, to whom I am most glad to acknowledge my indebtedness, not only for a great part of the pleasure of my visit to his city, but for a great part of the data I shall be able, though only in most hasty fashion, to give my readers. Interesting as is the place in itself alone considered, it is of course doubly interesting when we know the scenes that its stones have witnessed — when we read how the peasants were beheaded by hundreds in the market-place after their terrible revolt, till their blood ran in streams down the steep *Scmiedegasse* where our little hotel stands; when we find the place where some of their leaders were lowered over the wall by the friendly monks of the Franciscan convent; when we peer into the dungeon where one of the greatest of the city fathers, Heinrich Toppler — ancestor of the famous Nuremberg family of that name — met a dreadful death at the unjust hands of his jealous fellow citizens; when we see the great hall where Tilly sat in wrath after his long siege in the Thirty Years' War, vowing that the chief burghers should die; when we look at the great glass goblet holding thirteen quarts which was emptied at a draught by one of their number, who thus at the conqueror's challenge saved all their lives; when we see house after house where this emperor or another lodged on some famous journey north or south; when we examine the curious towers and gateways, each marked by some ghastly historical tale or ghostly and grotesque bit of legendary lore. Every stone of the city is alive with memories truthful or imaginary; but even if this were not so every street corner, every vista, whether from within or from without the gates, would still offer views of such beauty, such quaintness, such pictorial charm that the artist grows as excited, as bewildered, as wildly enthusiastic when on Rothenburg soil as is the historical student or the lover of fantastic mediæval lore. In the one case as in the other the degradation and isolation of the town has worked to preserve for us its charm. Neither modern history nor modern building has a word to say when Rothenburg tells its tale of mediæval and Renaissance days.

One line, however, of explanation. It must not be supposed that we have here an analogy with one of those dead and decaying Italian towns which offer an equally perfect picture of past times. Theirs is a picture torn, shattered and in distressful state. Rothenburg's is still more interesting because not painful in any way. It is not a decaying nest of beggars who wrap themselves in the tattered and mouldy garments of the past. It is a bright, jolly, contented little town, with its ancient buildings in good preservation and its streets, though not filled with the busy rush of modern life, yet peopled with well dressed, cheerful, "poor but honest" provincials and peasants. It is off the modern track, it is behind the times, but it is not dead or dying. It has a pleasantly busy little life within its own narrow borders, and every house is still the decent, cheerful abode of thrifty German burghers—though these are indeed but alien descendants of the rich, truculent, roystering, independent, art-loving burghers of centuries gone by. And in this fact lies, I repeat, the peculiar interest of the place. We do not see the same inhabitants it had of yore, and it requires a certain effort to reconstruct the brilliant panorama of its streets three hundred years ago. But the effort is not half so great since the town is still alive though in a different fashion, since we have more active basis to work upon than the filthy deserted streets, the plague-stricken houses, the wretched, degraded population of such a little Italian hill town as, for example, San Gemigniano.

But enough of generalities and of suggestions as to the interest Rothenburg possesses for the painter and the historian. I must now try to tell the architectural student very briefly of what it offers for his especial eye.

M. G. van Rensselaer.

THE PREVENTION OF FIRES IN THEATRES.

REPORT OF THE SPECIAL COMMITTEE OF THE FRANKLIN INSTITUTE.[1]

THE majority of the "Committee on the Prevention of Fires in Theatres" makes the following report: —

Theatres for two hundred years have not materially changed in form or arrangement, yet they have enormously increased in size.

The building materials employed for the stage have, however, remained the same (except that in many cases the joists of the stage floor are I-beams of iron); they are at present, as they formerly were, filled with masses of wood-work, boards, laths, canvas, gauze, etc., piled up as if it was the sole purpose of the builders to crowd together as many inflammable substances as possible.

The only important changes in theatres have been, first, the introduction of gas-lighting; and second, appliances for heating, both of which have tended to greatly increase the hazard.

Without going into any detailed statistics, your committee will give a few tables, compiled from the records of Foelsch and Hexamer, which are particularly instructive and interesting. For example, of 616 theatre fires there have occurred: —

In London	35	In Boston	11
In Paris	29	In Cincinnati	9
In New York	27	In New Orleans	8
In San Francisco	21	In Baltimore	6
In Philadelphia	17		

It is an alarming fact that the number of theatre fires is continually increasing. Sixty-nine occurred between 1851 and 1860, ninety-nine occurred between 1861 and 1870, one hundred and eighty-one occurred between 1871 and 1880.

During the last decade we have had theatre fires as follows: —

1871	20	1878	20
1872	13	1879	25
1873	16	1880	23
1874	15	1881	28
1875	14		
1876	19	Total	209
1877	17	Average, 19.	

Nineteen theatres have therefore, on the average, been destroyed yearly, during the last eleven years.

In a recent compilation your committee found that in 1882 twenty-three theatres were destroyed by fire.

Out of a great number of theatres, of which the age had been carefully ascertained, it is found that five out of two hundred and fifty-two theatres were burned before they were entirely finished or opened to the public; seventy were burned during the first five years after they had been built; thirty-eight were burned from the sixth to the tenth year of their existence; forty-five from the eleventh to the twentieth; twenty-seven from the twenty-first to the thirtieth; twelve from the thirty-first to the fortieth; twenty from the forty-first to the fiftieth; seventeen from the fifty-first to the sixtieth; seven from the sixty-first to the eightieth; eight from the eighty-first to the one hundredth, and three after the hundredth year of existence. From this table, which gives the longevity (if this expression may be allowed) of two hundred and fifty-two theatres, of which there are authentic accounts, may be seen that in the first five years nearly one-fourth were destroyed, while only three reached the age of one hundred years.

There is, perhaps, no fact which illustrates to us the frequency with which these fires occur so clearly as the repetition of these catastrophes at the same theatre. The following is a list of theatres which were three times totally destroyed by fire: Her Majesty's, London; Drury Lane, London; Covent Garden, London; the Imperial Opera-House, Moscow; Barnum's Theatre and Museum, New York; the Royal Theatre, Glasgow; the City Theatre, Namur; the Teatro São Pedro, Rio.

The following is a list of theatres destroyed four times: Astley's Amphitheatre, London; The Grand Opera, Paris; the City Theatre, Brunn; the National Theatre, Washington; the Bowery Theatre, of New York, leading the list, it having been five times totally destroyed by fire in less than forty years.

There is no more vicious argument than that which is frequently made, that it is unnecessary to improve theatres in our country, as they are much superior to those of Europe; lengthy arguments of this sort generally ending with the statement that fewer theatres are destroyed by fire in the United States than in any other country. To dispel such ideas from the public mind, your committee quotes the statistical comparison from the records of Foelsch and Hexamer, with the following astonishing results.

In grouping the six hundred and sixteen theatre fires, which have been recorded according to the countries in which they occurred, we have the following: —

In the United States	188	In Italy	50
In Great Britain	87	In Austria	33
In France	73	In Russia	28
In Germany	53	In Spain	21

All other smaller European States, fifty-six; all the other smaller non-European States, twenty-seven.

Your committee did not wish to make a report until it had thoroughly considered *how* the great number of fires at theatres, which is yearly increasing, could be lessened by the introduction of proper precautions; and by what means places where thousands congregate, not by necessity, but for pleasure, could be made entirely safe.

The consideration of the subject was taken up in the following order: — The hazards of (1) artificial light; (2) heating apparatus; (3) fire-works; (4) the use of paper wads in guns, and (5) the situation of the necessary work-shops, paint-lofts, spontaneous combustion of waste, etc.

After proper consideration of these subjects, your committee next studied methods for the improvement of theatres in regard to public safety, studying closely (1) the improvement of exits; (2) the division of the stage and rooms belonging thereto from the auditorium; (3) the opening of doors; (4) safety systems of lighting, heating, ventilation, etc.

The greatest number of fires are caused by the paraphernalia of illumination. The danger of coal-oil, which is much used in our country and Western theatres as an illuminating agent, is self-evident, but the hazards of gas, which but within a few years was the safest material at our command, are not so well understood. Besides the dangers of leakage and explosions, we have, in the case of gas illumination, hundreds of *flames* spread throughout a building, each forming a dangerous sphere around itself. Although the last-named dangers can and should be lessened by proper precautions, such as wire baskets and shields over the flames, still, when we consider the close proximity of the border-lights to combustible gauzes and canvas, and ponder on the hazards of temporary illuminating effects, where jets are fed through rubber hose which must be removed during change of scene, we must ask is there no other method of illuminating by which equally good artistic effects may be produced, and which at the same time will lessen or entirely do away with the hazards of the present system? Fortunately means are now at hand. By the labors of eminent electricians, we have at our disposal an agent by which the same, if not more brilliant, effects as those of gas can be produced, while doing away with the dangers of gas, the lamps themselves being absolutely safe. The finest piece of gauze might lie on one of these lamps without being harmed. At the same time the oppressive heat and deleterious products of combustion of gas are done away with.

Your committee does not deem it necessary to describe the systems of "Incandescent Electric-Lighting," the introduction of which would undoubtedly be one of the most necessary reforms of our present theatre system.

Your committee does not think that the arc-light could be introduced to advantage in theatres, except in conjunction with reflectors so as to increase the brilliancy of the incandescent lamps. The disadvantage of all arc systems would be (1) their unsteadiness; (2) the color of the rays, which would, as actors say, "bring out the paint," and by the want of warmth be disagreeable to the audiences. The immense advantages of electric incandescent lighting, assisted by reflected arc-lights over that of gas are, that it would do away with (1) the dangers from leakage and explosions of gas; (2) the oppressive heat of the numerous gas-flames, which dries out the wood-work, canvas, and ropes of the rigging-loft like tinder; (3) the fading of metallic colors caused by the products of gas combustion; (4) the very expensive processes of ventilation, which frequently do not give a sufficient supply of fresh air, may be greatly simplified, as it is the great number of gas-flames consuming more oxygen than the audiences do, which produces the "closeness" of theatres, and (5 and lastly) the fire-hazard from contact with the light, as the glowing parts with the incandescent lights are hermetically sealed inside of a glass globe. Your committee is fully aware of the fire-hazards of the electric-light, but the incandescent lights (and especially our American systems) are, through the efforts of different committees, and foremost that of the "New York Board of Fire Underwriters," so well supplied with safety "cut-outs" and "catches," and the erection of electric systems in the principal American cities is so well looked after by the special inspectors of the "Boards," that these dangers are reduced to a minimum. The practicability of electric-light for the illumination of theatres has been illustrated in the Savoy Theatre, of London, which has for over a year been illuminated with electric-light, proving it to be "a perfect artistic success."

Your committee has received the following letter from the management of the Savoy Theatre: —

"In reply to your inquiries (1) The electric-light is a perfect artistic success. (2) It costs at present, about twice as much as gas in England, but the proportion here would, no doubt, be much less, as gas is much dearer than in England. Ultimately, no doubt, the cost in England will be the same. Yours faithfully, R. DOYLY CARTE."

Theatres should be heated by steam or hot-water systems. Stoves and heaters are objectionable. Where heaters are used, one-fifth of the registers should be so arranged that they cannot be closed, as

[1] Presented and accepted at the stated meeting of the Institute held Wednesday, April 18, 1883, and published in the *Journal of the Franklin Institute*.

many fires have been caused by overheated hot air pipes, in cases where all registers have been closed and the hot air could not escape. All register openings should be closed by fine wire netting to prevent combustible particles dropping into hot-air flues.

The only manner in which the dangers of fireworks may be lessened is by "*impregnating*" all scenery and gauze by approved processes. Your committee has for the past six months experimented with all ascertainable processes of impregnation. A process which your committee has found to be deserving of entire public confidence is that of Dr. J. Pafen, of Frankfort, Germany, which has been introduced to great extent; of its many commendable properties the following have been certified on inquiry. The material may be used on scenery which has been painted upon, without destroying or injuring the colors; scenery which is impregnated in this manner does not, on being used, fill the air with a fine dust, deleterious to actors and singers, which was found to be a most disagreeable feature in other processes.

Your committee, at its request through the kindness of Messrs. Mertz and Schaede, received the following testimonial: —

FRANKFORT-ON-THE-MAIN, August 2, 1882.

We herewith certify, on request of Messrs. Gustav Schaede and C. Rudolph Mertz, who have purchased the sole right to impregnate combustible substances for North and South America from Dr. Pafen, of this city, that after one year's use the following results have been obtained: —

1st. The objects impregnated have proved, even after considerable length of use, to be perfectly incombustible.

2d. This quality has not been diminished by use in the least, as we have ascertained by repeated tests.

3d. The fabrics and colors have not suffered by the impregnation.

4th. No injurious effect of any kind has been observed to occur by Dr. Pafen's method on the voices of the singers and actors.

C. RUDOLPH,
Engineer of the Opera-House.
MAGNUS PROESLER,
Inspector of the Opera-House.

Satisfactory results have also been obtained by the processes of Gautsch, Judlin, by sulphate of ammonia, and by silica deposited into the fibres by precipitation.

Besides impregnating the scenery, the wood-work should be covered with some fire-proof paint. Your committee experimented with all the solutions they could ascertain, and had most satisfactory results from "asbestos paint," and especially from the so-called asbestos concrete.

Paper wads in guns and pistols, by settling on gauze or canvas while still glowing, have repeatedly caused theatre fires. Your committee believes that the practice of using wads of hair would overcome this hazard. Quick-burning powder is recommended for theatre fire-arms; since the sole purpose is to make a noise, and slow-burning powders, especially *soda powders*, being deliquescent, such grains of powder will, when ignited, be carried in a burning condition considerable distances from the muzzle of the gun, thus readily igniting combustible objects.

The work-shops and paint-loft should be located outside of the theatre proper, and should communicate with the stage only by double iron-lined doors with stone sills.

Your committee has thought best to bring all minor matters into a series of recommendations, but before proceeding to give them must mention that there are important automatic devices for opening a smoke-flue above the stage, lowering the fire-proof curtain, and sending an alarm, none of which have, however, been introduced into the United States.

Your committee have sought much to find a good fire-proof drop-curtain.

The results obtained of woven asbestos *cloth* were most satisfactory, and smaller experiments, as well as one performed on a large scale at the Brooklyn Navy Yard, convinced your committee that it makes an excellent fire-curtain.

Transparent wire drop-curtains are objectionable, as in case of fire they allow smoke to pass through them, and by not cutting off the view of the fire from the auditorium, increase the panic.

Your committee does not think that the curtain used at the new Opera-House at Geneva is much better.

This consists of a wire screen of very fine meshes, like the material employed for a Davy's safety lamp, they being covered on both sides with a coarser wire netting. Curtains of this kind have not yet stood the "fire test." Your committee believes that in case of fire it will not be of better service than the ordinary wire curtain.

The curtain recently constructed for the new theatre "des Celestins," at Lyons, is constructed on a similar principle to the above, and is hemmed in by a border of sheet-iron two metres broad. Although this will somewhat reduce some objections, yet it is not a commendable curtain.

At Lyons, Lille, Toulon, and for the new "Théâtre des Arts," at Rouen, curtains of iron have been introduced. These consist of a number of horizontal slats put together like Venetian window blinds, and are raised and lowered by hydraulic apparatus. Whether such curtains will in the course of time prove themselves successful, is still problematical. The two great objections which your committee sees in these curtains is their tendency to rust, and the ease with which they would warp at large differences of temperature, as in case of fire.

Sliding curtains of corrugated sheet-iron have stood best in case of fire. They have been employed with great success at the Hof Theatre, Dresden; Central Halle, Hamburg; Hof and National Theatre, Munich; New Opera-House, Frankfort-on-the-Main; Wallmer and Friedrichwilhelmstadter, Belle-Alliance Walhalla, and Central Theatres at Berlin; Concordia Theatre, Hamburg, and others.

Your committee cannot too strongly bring out the fact that the regulating apparatus of the curtain should be on the stage; and not, as was the case at Vienna, in the rigging-loft, a place which in case of fire immediately becomes inaccessible. If the apparatus is one which is set in motion by a crank, the handle should be so fixed that it cannot be removed, or it will in most cases be taken off in order to gain room, be stowed away somewhere, and will at the moment of danger be missing.

Your committee heartily endorses the action of the authorities of Vienna, who now require a man posted at the safety-curtain lowering apparatus during all performances.

Your committee has had no chance of testing the patent curtain of Carl Pfaff, but from the report of the special committee of the "Oesterreichischen Ingenieur und Architekten-Verein," has been convinced that it is one, if not the most meritorious fire-curtain known up to this time; the above committee after careful tests gave the following report of its properties: (1) That a curtain constructed on this principle could be used daily with surety and with a small amount of trouble. (2) That they were satisfied of the durability of the proposed invention. (3) That in case of fire the invention would work with rapidity. (4) That it would give the auditorium the necessary protection. (5) That it would restrict the fire to the stage.

Your committee begs leave to submit the following recommendations, many of which are already law in several European States: —

First. All corridors should increase in width from the theatre to the open air.

Second. All extra exits (fire-corridors) should be marked as such in large, bold letters; should be lighted by oil lamps (not petroleum products; sperm or lard oil is recommended), and should be unbarred from the opening of the theatre until it is closed. Before the close of every performance they should be opened, that the extra exits may become known to the public.

Third. All doors should open outwards.

Fourth. Banisters or railings should be fastened to the walls of all stairways; they should be fitted into grooves in the wall; enough room being left between the rail and the groove to allow hands to slide freely on the rail.

Fifth. Long rows of seats should *not* be permitted. Rows should be cut by an aisle at least at every twenty feet.

Sixth. Movable seats should not be allowed. Seats should be tightly screwed to the floor. Fixed chairs with a spring attachment, which throws back the seats when not occupied, are strongly recommended.

Seventh. No scenery, properties, materials, or impediments of any description should be allowed to remain in corridors.

Eighth. The stage should be divided from the auditorium by a fire-proof drop-curtain. Transparent wire curtains should not be used for this purpose.

Ninth. The fire-proof drop-curtain should be kept down at al. times except during rehearsals and performances; after which it should be immediately let down, and not raised until fifteen minutes before the beginning of the next performance.

Tenth. Doors and openings in the proscenium wall should be with stone sills, iron lined (on both sides), and should be self-closing.

Eleventh. The system of lighting the stage should be separated from that of lighting the auditorium; each should have a distinct feed-pipe or circuit.

Twelfth. Gas-flames should (without exception) be covered by wire baskets. These baskets are to be made sufficiently large, so that the wire may never be heated to a greater temperature than 250°.

Thirteenth. Border and foot lights should be lighted with electricity, *not with an open light.*

Fourteenth. Every theatre should be supplied with a sufficient number of fire-hydrants, with hose and nozzle attached ready for instant use, and not removable.

Fifteenth. A large reservoir, holding at least eight thousand gallons, should be placed over the auditorium ceiling; kept at all times full of water, connecting with stand-pipes, and not allowed to freeze.

Sixteenth. A sufficient number of fire-buckets (used in case of fire only) kept always filled should be distributed conspicuously over the premises.

Seventeenth. Every theatre should have a number (varying with the size of the theatre) of firemen.

Eighteenth. In order to keep control of the various theatres, a theatre inspector should be appointed in each town, who should have full power to enter every theatre at any moment, and whose duty it should be to see that these or other suggestions made law by an act of legislature, are faithfully carried out.

Nineteenth. The testing of all gas-pipes, hydrants, and fire appliances should be performed at least four times a year, and oftener if the theatre inspector requires.

Twentieth. Every theatre should be connected with the nearest fire-station by numerous electric alarms, most of which should be automatic.

Twenty-first. The theatre should be patrolled at day and night, by watchmen, who should be controlled by watch-clocks, distributed over various parts of the building.

Twenty-second. No smoking should be allowed in the theatre, except where required on the stage in the representation of plays.

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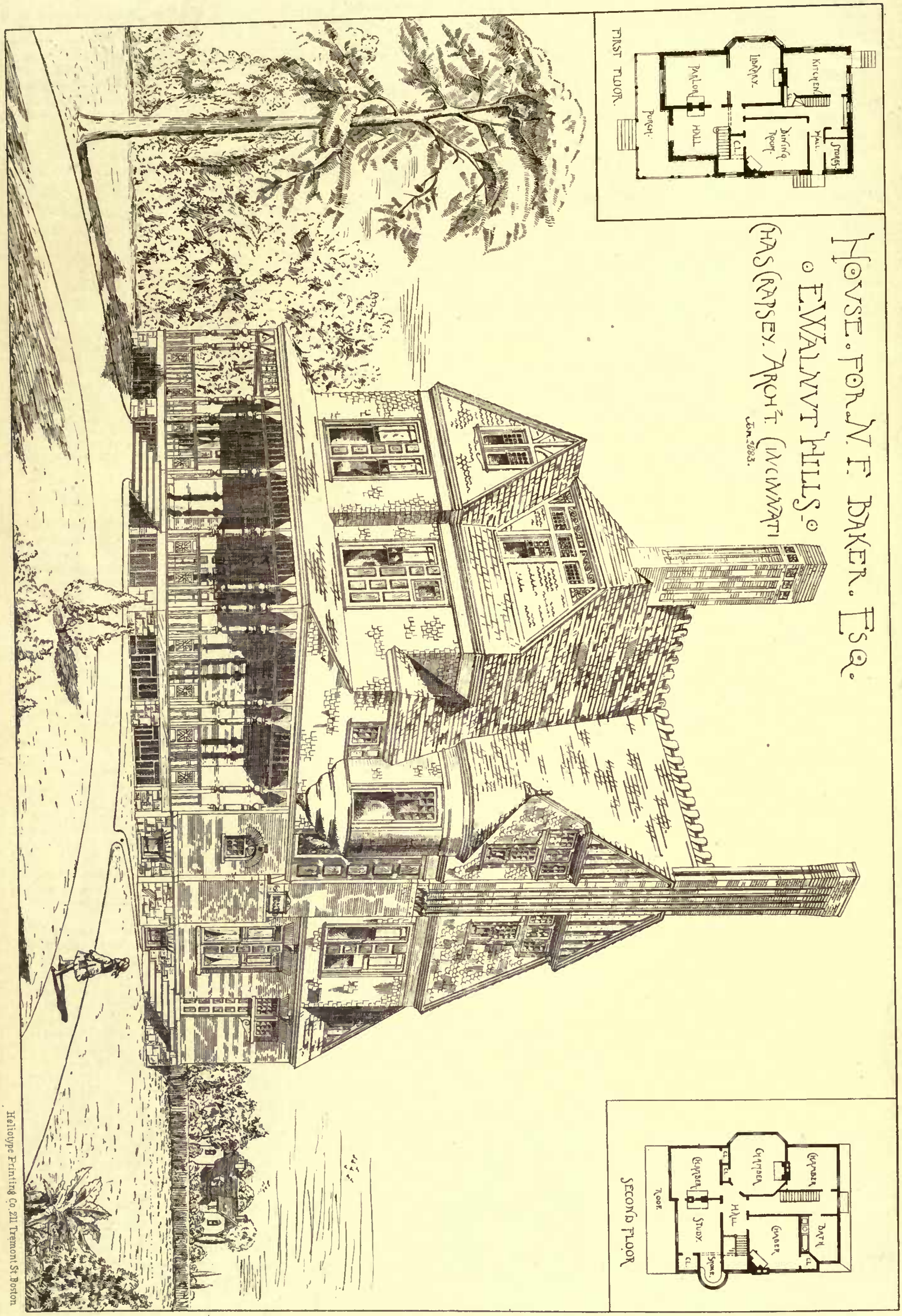

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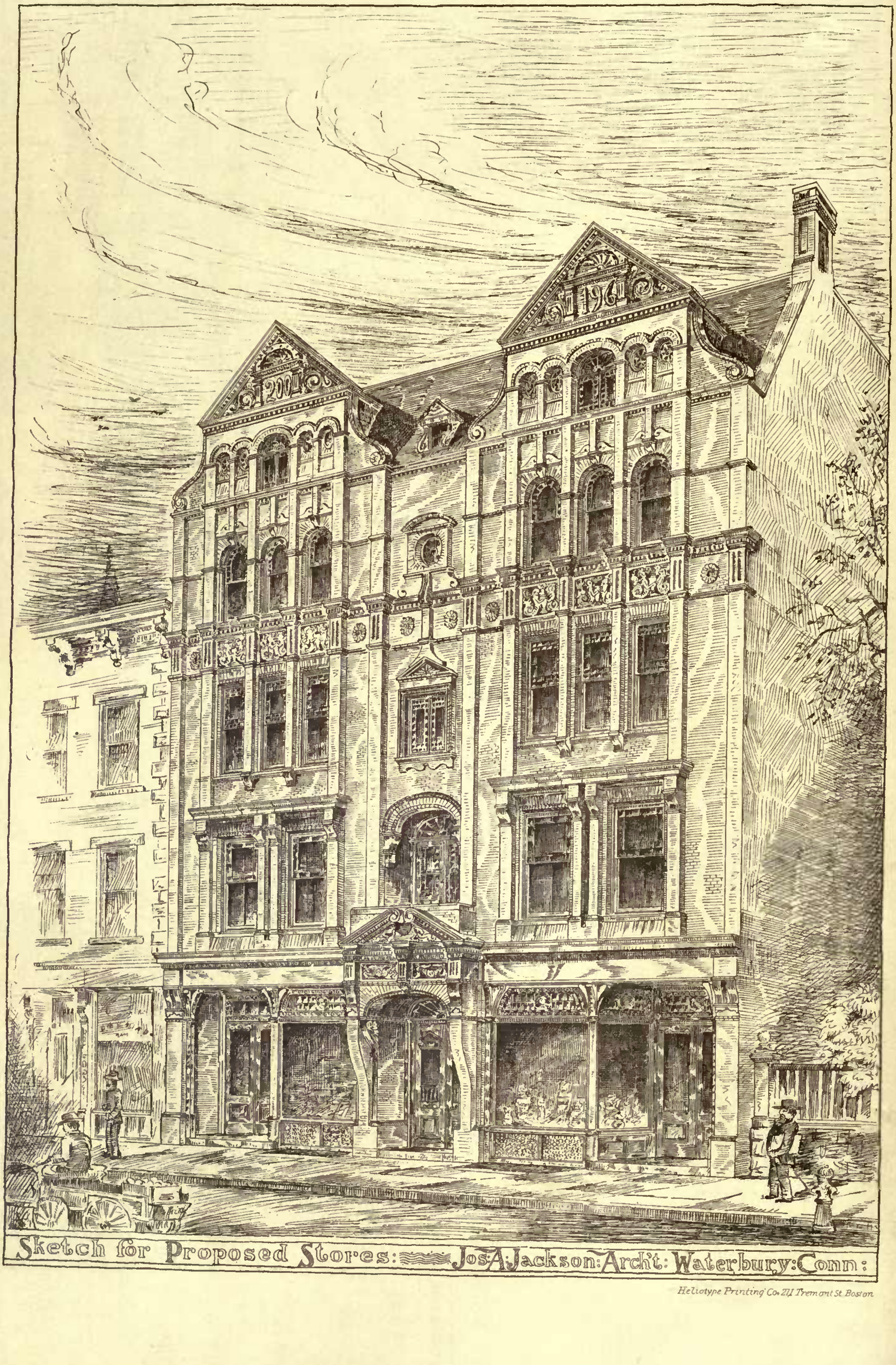

Sketch for Proposed Stores: Jos. A. Jackson: Arch't: Waterbury: Conn:

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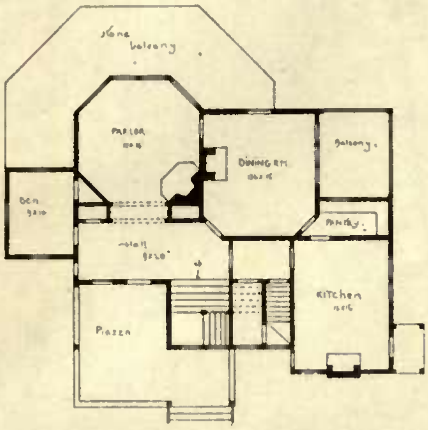

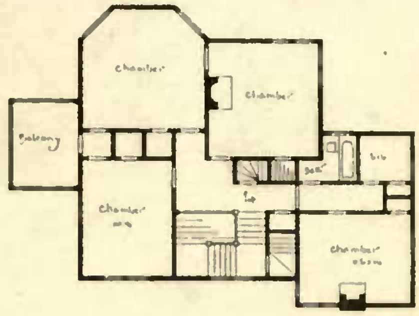

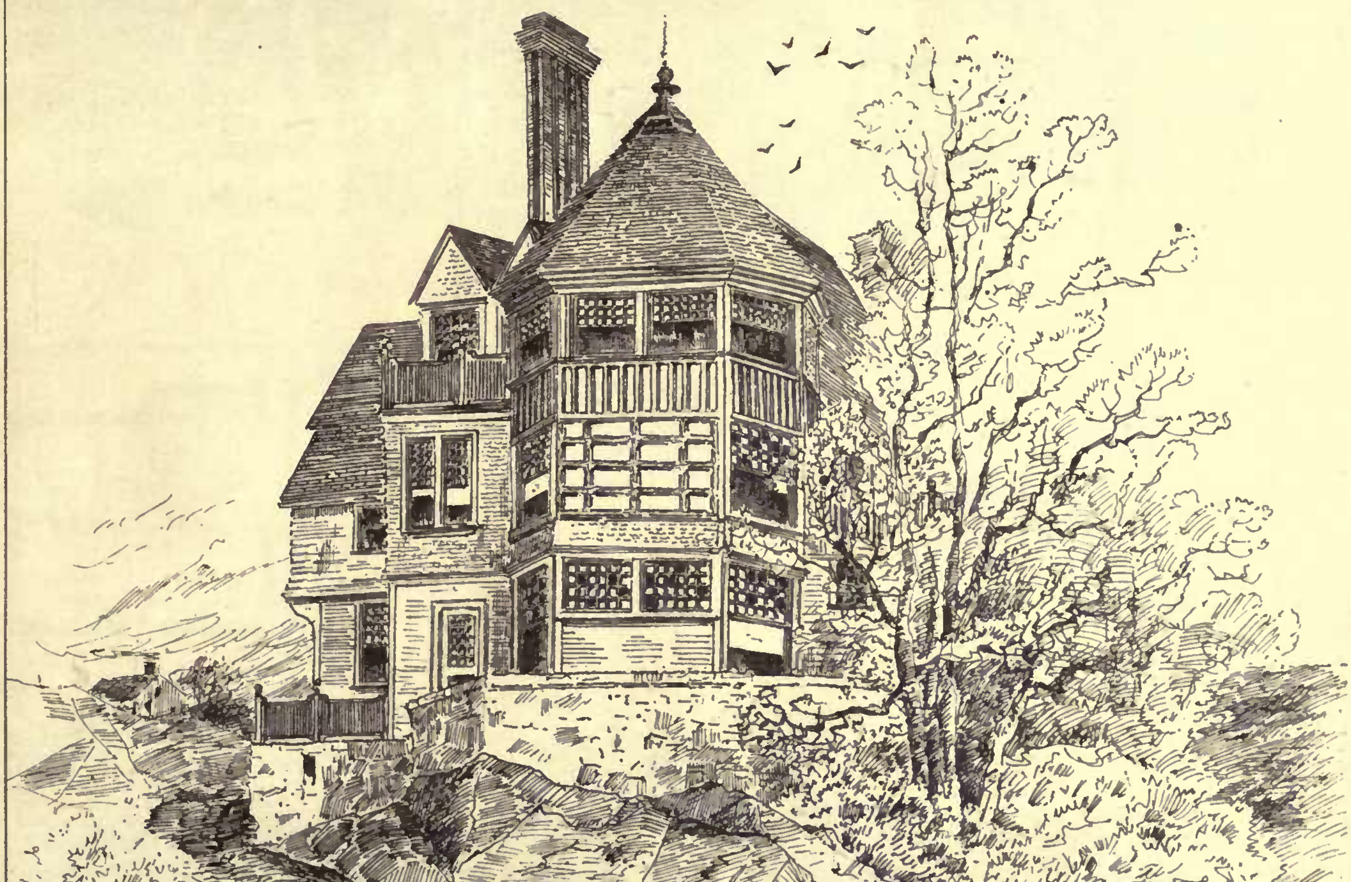

House to be built at Washington – Conn.
Rossiter & Wright Archts
149 B'way New York

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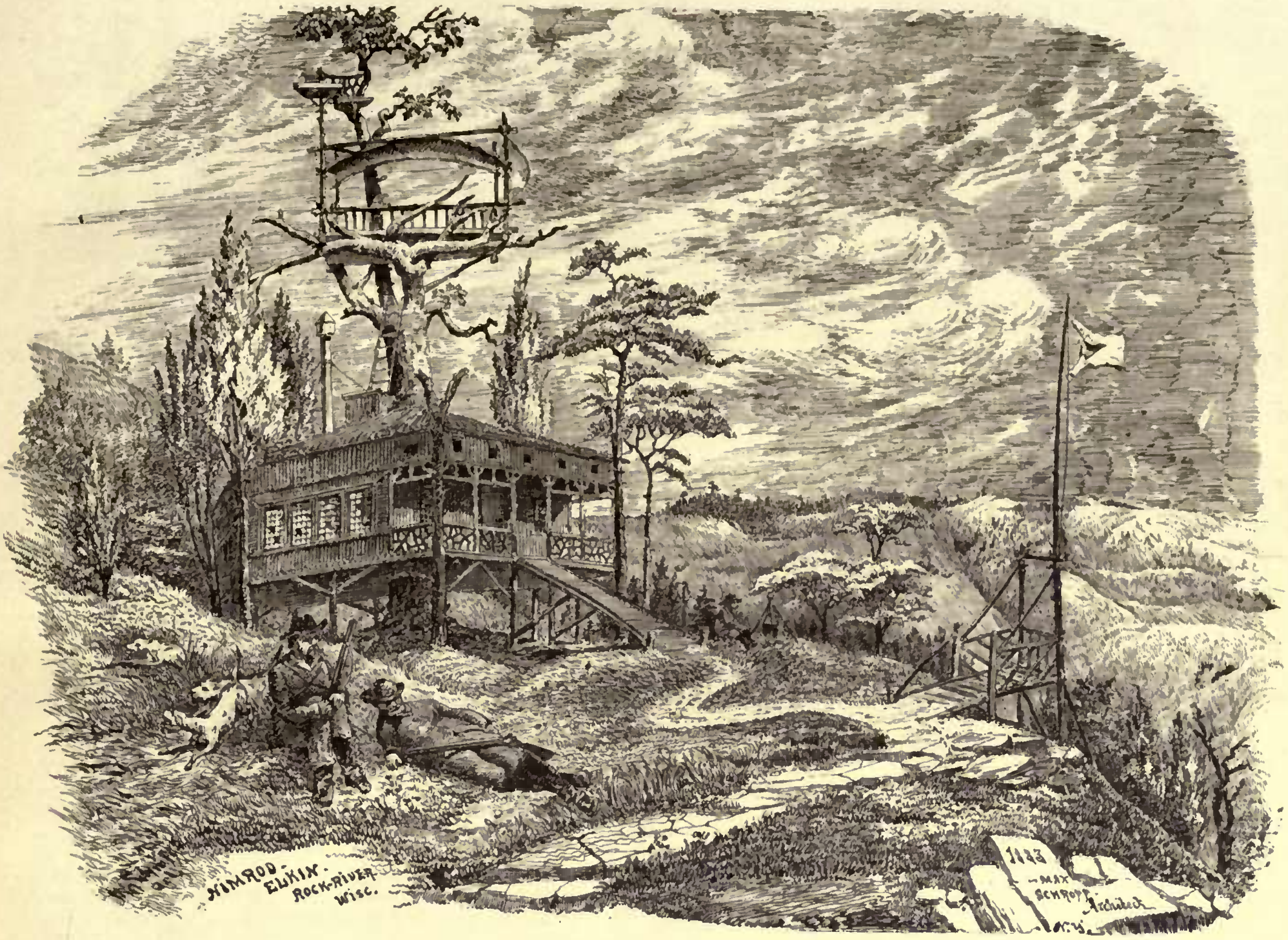

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Twenty-third. No swinging gas-brackets should be allowed in any part of the theatre.

Twenty-fourth. Wood-work which is within eighteen inches of a gas-flame should be covered with sheet-iron or tin, but in such a manner that air may circulate between the iron and the wood.

Twenty-fifth. Border-lights should be so enclosed that no part of the enclosing body may be heated to a higher temperature than 250° Fahrenheit.

Twenty-sixth. Where heaters are employed the registers should be covered by fine wire netting, and at least one-fifth of the registers should be so arranged that they cannot be closed.

Twenty-seventh. Scenery and other stage supplies should not be stored on the stage, but in a separate *fire-proof* dock.

Twenty-eighth. No more scenery should be put upon the stage than is necessary for, at most, two performances.

Twenty-ninth. The use of fireworks, Roman candles, red fires, etc., should only be permitted when it has been shown to the Theatre Inspector's satisfaction that the scenery and gauzes have been impregnated by proper substances, and that the wood-work has been covered by some satisfactory solution.

Thirtieth. Wads of pistols and guns should be of hair only (not paper or cotton).

Thirty-first. If straw, hay or any other easily inflammable substance should be required in a scene, it should be removed to a fire-proof place immediately after the scene in which it is used.

Thirty-second. A large smoke-flue should be provided above the stage. Automatic devices are recommended.

Thirty-third. That the public itself may have control in this matter, a complaint book should, in every theatre, be laid open to the public, where any individual may enter any faults of construction or arrangement which he has noticed. This book should not be the property of the proprietor of the theatre, but should belong to the Theatre Inspector, the Fire Marshal, and Building Inspector of the city.

Thirty-fourth. Numerous permanent iron ladders should be fixed on the outside of the building, so that the firemen may readily enter the theatre while the corridors are still filled by the departing audience.

Thirty-fifth. Oil lamps should be cleaned and trimmed in a separate lamp and oil room, where, also, the oil should be stored. Oily rags and waste should be kept in small quantities only, and in iron boxes closed by an iron lid, and standing on brick, or other fire-proof substance, and as soon as they accumulate should be burnt.

Thirty-sixth. The work-shops and paint-loft should be outside of the stage building.

Thirty-seventh. Automatic sprinklers and steam jets should be placed over and on the stage. (The theatres of Boston are required by law to protect the stage by a system of automatic sprinklers. In November, 1882, a fire was extinguished at the Providence Theatre Comique, during a play, by automatic sprinklers, with so little injury, even to the scenery, that the performance was not stopped).

Thirty-eighth. Ground-plans of the auditorium, giving a clear idea of the building, corridors, stairways, etc., should be prominently located in the halls, and should be printed on the back of programmes.

Your committee is well aware of, and have followed with sympathy and hearty approval the labors of the Asphaleia, a society of prominent German and Austrian technologists, who have made it their purpose to construct a theatre up to the requirements of our time, which should not only fulfil all technical qualities, but bring the theatre to an artistic perfection which it now lacks. This work your committee thinks they have almost accomplished, and all new theatres should be built according to their suggestions.

Your committee has tried to correct objectionable and suggest better features in theatres as they now exist, and has especially tried to make suggestions in reference to American theatres.

Your committee at first intended to inspect and report on all theatres of Philadelphia, as was done by a similar committee of the Citizens' Association of Chicago, but on due consideration doubted whether it was vested with sufficient power by the Institute to carry this plan into effect.

Your committee in closing its report cannot help referring to two most necessary factors in reforming our theatres. (1) The education of the public on this subject by popular lectures, articles and papers: and (2) the co-operation of prominent mechanics and scientists. While the mechanical engineer of to-day, through the arm of a child, moves enormous loads by his hydraulic cranes, the numerous hoisting apparatuses of the stage are of a truly pitiable simplicity.

The problem of building theatres properly is eminently one for the mechanical engineer, and will never be solved if the technical resources of our age are not taken into account, and brought to bear on the question.

C. John Hexamer, C. E.
Thomas Shaw, M. E.
Henry R. Heyl.

Minority Report.

Philadelphia, April 18, 1883.

The undersigned heartily approves of all the foregoing except the thirty-second recommendation, for a smoke-flue above the stage, and that portion which refers to the work of the Asphaleia, concerning which he has no personal knowledge. He considers a smoke-flue above the stage as in the highest degree dangerous, and calculated to increase the draught and strengthen the flames, producing a general conflagration instead of a local blaze.

Robert Grimshaw.

THE ILLUSTRATIONS.

HOUSE FOR N. F. BAKER, ESQ., WALNUT HILLS, CINCINNATI, O. MR. CHARLES CRAPSEY, ARCHITECT.

This house was lately contracted for, the contract price being $10,265, the owner to furnish grates, mantels, gas-fixtures and furnace. The inside finish is of clear white-pine varnished, the stairs only being of hard-wood. The outside walls are of local brick laid in red mortar for the first story, and frame and shingles above. Roof of slate. Four good finished rooms in the attic. H. E. Holtzinger, builder.

HOUSE OF H. S. CHASE, ESQ., BROOKLINE, MASS. MR. E. A. P. NEWCOMB, ARCHITECT, BOSTON, MASS.

NIMROD–ELKIN, ROCK RIVER, WIS. MR. MAX SCHROFF, ARCHITECT.

SKETCH FOR PROPOSED STORES. MR. JOSEPH A. JACKSON, ARCHITECT, WATERBURY, CONN.

HOUSE FOR E. K. ROSSITER, ESQ., WASHINGTON, CONN. MESSRS. ROSSITER & WRIGHT, ARCHITECTS, NEW YORK, N. Y.

The house has been designed to take advantage of a rocky knoll and a parapet wall is to be built around as shown for a rough balcony enclosure. In the sketch has been given an accurate outline of the situation, with the trees which form an important adjunct of the site, which, taken all in all, is very picturesque. The house is to be built of wood, upper story shingled, and slate roof. Cost of house about $8,000.

SUGGESTIONS FOR THE CONDUCT OF ARCHITECTURAL COMPETITIONS.

Sanctioned by the Royal Institute of British Architects.

9 Conduit Street, Hanover Square, London, W.

The promoters of an intended competition should, as their first step, appoint one or more professional assessors, architects of established reputation, whose name or names should be published in the original advertisements and instructions, and whose decision should govern the selection of the designs in all stages of the competition.

2.— The duty of these assessors should be: —

a. To draw up the particulars and conditions as instructions to competitors, or to advise upon and, should it be necessary, revise or supplement them if already drawn up;

b. To determine which of the designs conform to the instructions;

c. To exclude all others; and

d. To advise the promoters on the relative merits of the designs admitted to the competition.

3.— Every member of the body promoting the competition, and every assessor engaged upon it, should abstain absolutely from taking part in the said competition, or from acting as architect in the execution of the proposed work.

4.— The number and scale of the required drawings should be distinctly stated, and they should not be more in number or to a larger scale than necessary to clearly explain the design. If perspective views be required, they should be uniform in size, number, mode of coloring, etc.

5.—Competitions should be initiated either (A) by inviting preliminary sketches, involving only moderate cost to each competitor, preparatory to a final competition; or (B) by invitation without sketches; or (C) by personal invitation. That is to say: —

If (A)—By advertisement, inviting architects willing to compete for . . . . (*here describe the intended work*) to send in their names by a given day, on receipt of which each applicant should be supplied with the instructions prepared under the advice of the professional assessor or assessors. Each applicant, from such instructions, should send in by a given date a sketch design (*here describe the limit and character of such sketches*). The promoters, with the advice of the professional assessor or assessors, should select from such sketch designs not less than . . . . (*here specify the number*), the authors of which should be invited to join in a final competition, in which each should receive £ . . . . (*here state the amount*) for the preparation of his design. From these designs a choice should be made of the architect to carry out the work.

If (B) without sketches — By advertisement, inviting architects willing to compete for . . . . (*here describe the intended work*) to send in their names by a given day, with such other information as the candidate may think likely to advance his claim to be admitted to the competition. From these names the promoters, with the advice of the professional assessor or assessors, should select . . . . (*here specify the number*) to compete, and each competitor thus selected should receive £ . . . . (*here state the amount*) for the preparation of his design. From these designs a choice should be made of the architect to carry out the work.

If (c) — By personal invitation to a limited number of selected architects, to join in a competition for . . . . (*here describe the intended work*), each competitor to receive £ . . . . (*here state the amount*) for the preparation of his design.

The author of the design which may be awarded the first place in point of merit should be employed to carry out the work.

In each case, (A), (B) and (C), the amount of remuneration for designs should be fixed by the promoters, acting under the advice of the professional assessor or assessors.

6.— Each design should be distinguished only by a motto or device, and any attempt to influence the decision of the promoters, or of the assessor or assessors, should disqualify a competitor.

7.— A design should be excluded from a competition: —

a. If sent in after the period named (accidents in transit excepted);

b. If in violation of the instructions;

c. If it do not substantially give the accommodation asked for;

d. If it exceed the limits of site, and

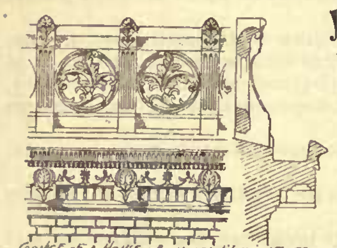
e. If the assessor or assessors (with or without the assistance of a surveyor) should determine that its probable cost will exceed the intended outlay (if specified in the instructions), or the estimate of the competitor should no outlay be specified.

8.— It is desirable, in a final competition under section (A) of clause 5, that all the submitted designs except any excluded under clause 7, should, with the consent of their authors, be publicly exhibited after the final award. The decision of the assessor or assessors and of the promoters should be published at the time of exhibition.

9.— The work, if carried out in any shape, should be placed in the hands of the architect whose design has been adjudged to be the best, and he should be placed in exactly the same position, in relation to the employer and the intended work, as he would have been had he alone been professionally consulted. In case a competition has resulted in the selection of an architect, and the instructions to him to proceed farther in the matter are not given within twelve months from the time of the architect being selected, he should be paid at the usual professional rate, under the advice of the assessor or assessors, exclusive of the sum paid to him in common with the other competitors: such payment to be taken on account of commission, should the work be carried out at a future time under his superintendence from the design submitted by him in competition.

J. Macvicar Anderson, *Hon. Sec.*
Re-issue: 9th April, 1883. William H. White, *Secretary.*

THE POWER OF EXPLOSIVES.



Cornice of a House Boulevard l'Imperatrice. Paris. — M. Vandenburgh, Archt.

The following by Mr. George M. Roberts, technical manager for Nobel's Explosives Co., Limited, of England, conveys information of general interest: —

Nitro-glycerine and dynamite do not, when exploded, exert such a force as is popularly believed. To speak precisely, the power developed by the explosion of a ton of dynamite is equal to 45,675 tons raised one foot, or 45,675 foot-tons. One ton of nitro-glycerine similarly exploded will exert a power of 64,452 foot-tons, and one ton of blasting gelatine, similarly exploded, 71,050 foot-tons. These figures, although large, are not enormous, and need not excite terror. Seventy-one thousand tons of ordinary building-stone, if arranged in the form of a cube, would measure only ninety-six feet on the side, and if it were possible to concentrate the whole force of a ton of blasting gelatine at the moment of explosion on such mass, the only effect would be to lift it to the height of a foot. The foregoing figures are derived from experiments made at Ardeer with an instrument which gives accurate results in measuring the force of explosives. The power exerted on surrounding objects by an explosion is in the inverse ratio of the cube of the distance from the point of explosion. Thus, at one hundred feet from the exact point of an explosion the power is only the cube of one one-hundredth, or one one-millionth part of what it is at a distance of only one foot from that point; or, in other words, if the power at one foot from the spot be represented by 1,000,000, at the distance of one hundred feet it will be but 1. It is thus seen that the effects are intense locally, but comparatively trifling at even short distances. If a ton of dynamite or nitro-glycerine were exploded in a London street the effects would be felt severely in the immediate neighborhood only of the explosion, and beyond that they would be confined to the mere breakage of windows. Indeed, it would be impossible by a single explosion, however large, to do damage to any considerable extent beyond the immediate neighborhood in which the explosion took place. On one occasion I happened to witness the explosion of over a ton of nitro-glycerine from a distance of only sixty yards. The nitro-glycerine was about ten feet beneath the level of the ground, which was of sand and covered with water. Beyond the breakage of windows and the bursting of a few doors in the surrounding buildings there was no damage done. A little sand was thrown over me, but I received no personal injury.

Vague statements have been made from time to time, promulgated to induce the belief that there are stronger explosives than nitro-glycerine and nitro-glycerine preparations, and that the wretched men who have been guilty of the late attempts on public buildings, etc., are in possession of more powerful explosives than any known to chemists. The public may rest assured that such is not the case. Nitro-glycerine and its preparations form the strongest explosives yet known. The strongest of these is the material known as blasting gelatine. It consists of nitro-glycerine combined with a certain portion of nitrated cotton. It is much more difficult to prepare than either nitro-glycerine or dynamite, and cannot be made by unskilled persons. If the power of dynamite be represented by 1,000, that of nitro-glycerine will be 1,411, and of blasting gelatine 1,555. The one and one-half hundred-weight of nitro-glycerine seized by the police the other day would, if exploded, exert a force of only 4,833 foot-tons, and if converted into dynamite it would represent a force of only 4,567 foot-tons. The conversion of nitro-glycerine into dynamite reduces the power of the former, but renders it more easy and safe to handle and use. The power given above is comparatively insignificant, and as it is the maximum effect that could be produced under the most favorable circumstances on the very spot of explosion, it never could be obtained in practice. It is therefore absurd to say, as was said the other day in a London paper, that the explosion of such a quantity of nitro-glycerine would blow up the whole of London. In fact the explosion could scarcely be heard over London, and the damage done by it would be strictly local. I have often, by way of experiment, exploded one pound of dynamite suspended from the end of a fishing-rod by a string about six feet long, holding the rod in my hand the while. As there is no solid matter to project I received no injury, and the end of the fishing-rod was not even scratched. About three feet of the string at the end of the rod was always left uninjured.

A BIOGRAPHICAL SKETCH AND ITS LESSONS.

Tomb of Felix Duban. Paris. M. Duc Archt.

The scene of this narrative is laid in the Isle of Ely,—that solitary eminence which, encircled by the sluggish Ouse, breaks the monotonous level of the lone fen country,—whereon 1,200 years ago Saint Etheldreda in her flight from Egfrith, laid the foundations of her monastery, rousing with hymns of unaccustomed praise the wolf and the otter from their lair, and the stork and the bittern from their immemorial home.

The lapse of centuries has wrought but little change in this desolate region. No forests have been cleared by the encroaching industry of the husbandman, nor has the earth been cumbered and the heavens darkened by the hideous but inevitable accompaniments of our spreading civilization. Far as the eye can reach the land lies wrapped in its mantle of gray mist, its long level lines broken here and there by a row of poplars, standing as sentinels over the quiet little homesteads which dot the landscape, their red tiled roofs and chimney-tops telling sharply out in "the purer ether and diviner air" above the level of perpetual mist. The description of the locality by an old chronicler will in the main apply. Still "it is a watery waste, affording only deep mud with sedge and reeds, and possest by birds, yea rather [he adds] much more by devils."

And such was its aspect in the first quarter of the fourteenth century, in which our story opens. It is one of the saddest periods in our annals. The hand of a recent historian, whose early death we all deplore, has painted it for us with unexampled power and fidelity, and it is scarcely possible to deepen the shades of the picture he has left us. A despotic king, a dissolute court, a turbulent baronage "grinding the faces of the poor," a despairing peasantry, a country harried by bandits; wars in France, wars in Scotland, wars on every hand, just and unjust, waged on any or no pretext, and pursued with unrelenting and undiscriminating ferocity; and behind all this the twin spectres of plague and famine! The conflict of man with man, and of nation with nation, was as fierce and persistent as though the message of peace on earth had never been delivered, and man's only business here was to kill and be killed. And yet one catches here and there, as through a rift in the encompassing gloom, glimpses as of a brighter world, visions of peaceful and holy lives, homes of art, culture and religion.

In the year of grace, 1314, the fatal year of Bannockburn, with its savagery and shame, there is, so the chronicler of St. Alban's tells us, in his cloister at Ely, a young monk, renowned for skill in the goldsmith's art. The word was then accurately descriptive. If one reflects for a moment upon the part which that art played in both ecclesiastical and civil life, the priceless relics which have come down to our day, the countless treasures which were "borrowed" by monarchs perplexed between a hungry army and empty coffers,—on those other treasures which were cast into the melting-pot by a rapacious king and his greedy court; if one thinks of the sacred

vessels used in the services of the church, the shrines, the lamps, the jewelled crosses, the costly trappings of kings and courtiers, one will begin to realize the scope of that beautiful art in which this young monk excelled, and to appreciate that skill which could distinguish him amongst so many cunning fellow artists; but, in addition to this special gift, he was, we are told, no less remarkable for his acquaintance with the mechanical arts, and their application to the business of life. Clearly, then, this is no ordinary man. A proficient in both art and science; endowed, moreover, with other graces, of which we shall hear more anon. Thus equipped, he turned his mind, the records say, to the study of architecture. We need no assurance that the art never had a more promising student, and we can well believe that distinction in his new sphere was sure and speedy. His bishop, John de Hotham, a munificent patron of art, a courtly prelate, and a Lord Chancellor to boot, employed on Royal embassies, speeding hither and thither at his king's behest, charged with delicate and weighty duties, having a wide knowledge, therefore, of men and cities, and versed in all the lore of statecraft,—saw the stuff of which this monk was made, and quickly got him elected subprior, charging him with, as there is some reason to think, the design —certainly, with the joint execution with John of Wisbech,—of the beautiful St. Mary's Chapel (now Trinity Church), attached to the cathedral church of Ely. The foundation-stone was laid by our hero, Alan, in 1321, and we have clear evidence that he was at the same time engaged in the design of Prior Crauden's Chapel, the new sacristy, and many minor monastic buildings. So evident is his supremacy in his new calling that he is forthwith elected sacristan, and, in virtue of this office, he has the sole charge of the fabric of the cathedral and its accessory buildings.

There were pressing reasons why this charge should be put into capable hands. The central tower of the cathedral — the weak point in cathedral construction from that day to this — had been giving the monks some anxiety, causing them sad distractions during the singing of the Divine offices, ominous cracks and fissures in the four supporting piers making themselves unpleasantly obvious. Alan at once closed the choir against the monks, screened off the western arch of the tower, and allotted the nave for the services of the church, doing, in fact, exactly what is now being done in the neighboring cathedral of Peterborough. Nor were the precautions in Alan's case taken a whit too soon, for on the night of February the 12th, 1322, the massive Norman tower, without farther warning, fell "with a sound as of an earthquake," shaking the town to its foundations, frightening the poor monks out of their five wits, startling the screaming wild-fowl from a thousand marshes, and breaking the heavy slumbers of the husbandman in many a neighboring grange. With the morning's light the extent of the calamity was all too evident. The tower in falling had carried with it the westernmost bays of the choir and the attached portions of both transepts, burying all in hopeless ruin. The terror and perplexity caused by the catastrophe is well expressed in the records of the time. But Alan was equal to the emergency, and we know how he set about his work of repair. After clearing the site he removed the bases of the four old piers which had given way down to the floor level, and there he left them; advancing the boundary of his new tower one bay into each arm of the cross, he secured eight points of support for his central structure in place of the original four. These eight piers he proceeded to underpin with concrete, and he satisfied himself by careful excavation of the sufficiency of his new foundations.

His next step was, with prudent forethought, to repair the marsh causeways by which his heavy loads of stone and his other materials were to travel, and he strengthened the bridges they would have to cross. One road, characteristically named Seggewick, was repaired at a total cost of 7½*d.*, a fact which throws a little light on the altered value of our modern currency. He next despatched trusty messengers to bargain for building materials. "Simon the glazier's boy" was sent to Barnack to bespeak stone, and after the manner of boys contrived to loiter out of his way, and lose himself. Oak, and lead, and other necessaries were duly bargained for, sheds were erected for the workmen, and Peter, the mason, and his brother, were put in charge of the stone-work. The story of the building of the octagonal dome and lantern is too trite for repetition. One of the happiest thoughts that ever entered the mind of man, it was carried out with surpassing skill. The result was not only supremely beautiful as a work of art, but it was, in every sense of the word, original. There is no evidence to show, all the evidence is against the presumption that its architect ever travelled beyond his convent bounds, or was acquainted, except, perhaps, by hearsay, with the domed churches of the East. Moreover, the system of construction used in them differs in principle from that employed at Ely, and Alan of Walsingham's masterly work remains to this day unique amongst the cathedrals of Europe.

His next work was to rebuild the western bays of the choir, and these, as re-designed and constructed by him, rank amongst the most beautiful of all the examples of our Middle-Pointed English Gothic.

In the year 1341, upon Prior Crauden's death, Alan was elected prior, and in 1344 his convent showed farther their sense of his worth by electing him with one voice to the then vacant bishopric. He ceased, as a matter of course, to hold the office of sacristan. The works so ably designed by him had been carried to a successful completion, only the internal decoration and fittings remaining to be done, and these could be carried out by subordinates with such general direction as Alan might still be able to exercise. But the election of the convent was set aside by the Pope in favor of one Thomas de l'Isle, a Dominican friar, who Micawber-like, was "on the spot" (Avignon) when the vacancy "turned up." The benefices were at this date filled by foreigners, and many and angry were the remonstrances on the subject. It was alleged that "the unlearned and unworthy were promoted rather than the poor and learned," and the high places in the Church were occupied by "suspicious persons who do not know the faces of their flocks, nor understand their language, neglecting the cure of souls, and shearing the sheep instead of feeding them." Alan was, on the next opportunity, a second time unanimously elected by the monks as their bishop; but again the choice of the convent was overruled, and Simon Langham, afterwards archbishop of Canterbury and cardinal, was consecrated in his stead.

In 1363, after fifty years of residence amongst them, his convent continued to hold him in undiminished esteem, but he was then approaching man's allotted limit of three score years and ten, and although the date of his death is not certainly known, it is believed to have taken place in the following year.

It is recorded of him that he was not only, as his works indeed testify, a consummate artist, a daring and successful engineer, but that he was a wise and capable administrator, and that notwithstanding the vast outlay which the works undertaken by him occasioned, the convent and its possessions grew and prospered under his rule. He was buried in the church he loved so well, and which his genius has done so much to adorn; and his epitaph, no longer extant, breathed a hope, in which we must all surely join, that he would be rewarded by a seat amongst the just in Heaven.

These few notes concerning him have been set down partly because his career embraces that half of the fourteenth century which exactly marks the culmination of our native architecture, an arc cut from the very zenith of that great artistic movement which, rising in this Western Europe in the twelfth century, declined and disappeared in the sixteenth; partly also, because this Alan of Walsingham combines in the range and catholicity of his attainments all the qualities of a typical architect.

His life has many lessons for us. His education was such as it befits each one of us to adopt. The training of the eye and hand in works of art proceeding with equal steps with the study of the physics and the natural laws which govern the universe. Then a practical acquaintance with building work,—probably working as an artificer, certainly in the capacity of a "clerk of works" before his final assumption of the chief control. We see that a great architect is necessarily a man of many gifts, and that his work offers a field for the exercise of the highest qualities. We see also that then as now the highest honor does not always wait upon merit; that as in our day so in his, "Princes foot it in the dust, while lacqueys to the saddle vaulted;" and finally, for our encouragement and consolation, that time sets all things right. The prelate who snatched the bishopric from Alan, — what is he now to us? His name would be forgotten but for his accidental connection with that of him whom he supplanted, while his defeated rival has taken his place forever with the great of all time.

Of the personality of this "*Flos operatorum*" we know but little; of his birth and parentage, nothing. We may reasonably conclude from his name that the county of Norfolk may claim him as one of her many illustrious sons, and of him she may well be proud.

His could have been no common nature to secure so early and retain so long the love and regard of all around him; and we cannot but chafe at the veil which hides from us all farther knowledge of the *man.* He has left us amongst the carvings of his cathedral portraits of his prior and of his bishop. Of himself, his work is his only monument. Apart from this, his history is almost a blank. The simple piety of his calling forbade the loud, vain-glorious self-assertion with which a later age has made us but too familiar.

But Fame (uncourted) guards his memory, and his name shall outlast the noblest of his works, — the crown and glory of the Isle of Ely.— *The Builder.*

MONTHLY CHRONICLE.

MAY 5. Explosion of a powder magazine on Priddy's Head, Portsmouth, England.

May 7. Disastrous fire at East St. Louis, Ill.

May 9. Hurricane in the Lehigh and Wyoming valleys, Pennsylvania.

May 10. Oil tanks at Communipaw, N. J., struck by lightning and burned. Six lives lost.

May 13. Cyclone in Missouri, Illinois, and Michigan.

May 19. Disastrous storm in Illinois and Wisconsin. Fifty-four killed, over two hundred wounded.

May 23. Fall of rear wall of G. M. Eddy & Co's., new building, New Bedford, Mass.

May 30. Panic on the Brooklyn Bridge. Twelve persons crushed to death, twenty-six injured.

MEASURING PAINTER'S WORK.

May 18, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT : —

Gentlemen,— I find it difficult to obtain the information elsewhere, and would ask the favor of a few hints from you on the following: —

In estimating the amount of paint (yds.) on the exterior of a building, where the painter contracted to do the work at a certain sum per square yard, what is the usual method of measurement,

and what allowances are usually made for work in cornices, about windows, etc., above the actual surface covered?

A reply will greatly oblige, and any suggestions or information on the subject will be appreciated by SUBSCRIBER.

[WE can hardly spare the space to quote details of allowances in measuring painter's work. Plain cornices are usually reckoned according to the girt, but enriched ones may have a double or treble allowance. Window sashes are often measured as if solid. The custom varies in different localities, but "Subscriber" might do well to use Vogdes' *Architect's Pocket Companion* as a standard which will probably be satisfactory to all parties. —EDS. AMERICAN ARCHITECT.]

WOODEN TRUSSES.

LOUISVILLE, KY., May 17, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you be kind enough to inform me if you are acquainted with a good work on wooden trusses, etc., together with calculations of their strains? I am desirous of procuring a good book of this kind, and would be obliged, if you would let me know where it can be procured and its cost.

Very truly yours, O. C. W.

[TRAUTWINE'S *Engineer's Pocket-Book* gives a very useful though condensed chapter on wooden trusses and joints. Price $5; to be had of any bookseller or ordered through W. T. Comstock, New York. Greene's *Graphical Analysis of Roof Trusses*, Wiley & Sons, New York, price $1.25, will give the principles of calculating strains by that method; and F. Schumann's *Formulas and Tables*, Van Nostrand, New York, $2.50, gives additional particulars. We should say that all three of these would be useful. — EDS. AMERICAN ARCHITECT.]

ARCHITECTURAL IRON-WORK.

INDIANAPOLIS, May 4, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you be so kind as to inform me which is the best book on architectural iron constructions, and oblige,

Yours respectfully, A SUBSCRIBER.

[*Architectural Iron-Work*, by W. J. Fryer, and Fairbairn, *On the Application of Cast and Wrought Iron for Building Purposes*, published by John Wiley & Sons, New York, Campin on *Iron Roofs*, published by D. Van Nostrand, New York.—EDS. AMERICAN ARCHITECT.]

GEOMETRY.

NEWARK, N. J., March 15, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — I would be very thankful to you for mentioning some books, with prices, about descriptive geometry, practical geometry, projectives. Very respectfully, CARL F. KEHMANN.

[CHURCH'S *Descriptive Geometry*, A. S. Barnes & Co., New York and Chicago. Hill's *Geometry for Beginners*, Ginn, Heath & Co., New York and Boston, perhaps comes the nearest to deserving the name of a work on practical geometry of any we know. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

BRANDED LABORERS. — The plan of numbering the Italian laborers on the West Shore road is said to have been found highly successful. Finding it impossible to keep track of the men by their names, the contractors concluded to number them. The number of each Italian is painted in plain figures on the seat of his pantaloons. Before beginning work in the morning and at noon and again at night, the men are formed in line, and the foreman passes in the rear of them and takes down each number, in order to ascertain who is present, as well as who is absent. The plan is beneficial in two ways — the men are easily recognized, and they are also kept from sitting down too much for fear of rubbing out the figures on the seats of their pantaloons. — *Exchange.*

EXCAVATIONS AT ATHENS. — The excavations of the Germans cover an irregular area of about ten acres. Just to the north of the excavations rises a steep, conical hill, once sacred to the god Kronos, from which a good, comprehensive view of the ruins can be obtained. Near the middle of the excavated area is the Temple of Zeus, with the remnants of its Doric columns, thirteen on each long side and six across the ends. North of that, not far from the foot of the hill of Kronos, is the Heraion, or Temple of Hera, one of the most ancient of the Olympic temples, and just east of the Heraion is the Metroon or temple of the mother of the gods. Along the northern edge of the excavated area, just at the foot of the hill of Kronos, are twelve treasure-houses, which were built by twelve Greek cities to hold their dedicatory offerings. From the northeast portion of the main excavated area an arched passage leads out into the Stadion, or race-course where the foot-races were run. Of the Hippodrome or horse-race course no remains have been found. South of the Temple of Zeus was the Bouleuterion or council-house, and in the northwest corner of the excavations are the foundations of the great gymnasium. All the excavated area is filled with the ruins of buildings, some of which have been identified with those mentioned by ancient writers, while in regard to others nothing is known. Though little more than the foundation of the various buildings is now in position, the fragments lying on the ground are sufficient to make an almost complete restoration of nearly all the buildings possible. The ground is literally covered with the drums and capitals of mighty columns, the great stones of massive walls and other architectural remains. The mass of brown ruins in the green, fertile valley is truly an imposing sight. What must it have been when those brown stones were brilliant with bright colors and gilding, when bronze and marble statues stood on every wall and pedestal, and the paths were crowded with the noblest of the Hellenic race! — *Correspondence of the Springfield Republican.*

STAINED FLOORS. — The popularity of stained floors goes on increasing. Nowhere are they more appreciated than in sleeping-rooms, where sweetness and freshness are the main considerations. Just what is the best stain is a difficult question to decide. A writer in the London *Queen* is of opinion that permanganate of potash is the best. It is much used in the navy, and is very satisfactory in sitting-rooms and sleeping-rooms. As most people know, permanganate of potash not only stains, but purifies and disinfects, the rooms which are stained. The mode of procedure is this: Procure a good quality of permanganate of potash; dissolve about an ounce and a half of the crystals in a gallon of boiling water — this will make quite a dark stain — use a stick to stir up the mixture: then with a painter's flat brush lay on the stain, working the way of the grain of the wood quickly and boldly. A small brush is useful for corners and crevices, and a pair of heavy gloves should be worn while at work, as the permanganate stains very considerably. Salts of lemon or the lemon juice will, however, quickly remove the stains from the hands. When dry the staining can be repeated if the color is not dark enough, and then when perfectly dry the floor should be rubbed dry with an old duster, and linseed oil should be rubbed on freely with a piece of flannel, always applying it with the grain of the wood. Two or three layers of the oil are an improvement, and firmly set the stain. The floor is then ready to be polished with beeswax and turpentine. To prepare this, spread or cut up the wax into small pieces; put it in a gallipot, and pour sufficient spirits of turpentine over it just to cover it; set the pot in the oven or on the stove until the wax is thoroughly melted, then set it aside to get cold, when it should be of the consistency of pomatum. Put on the wax—not too much of it — with a piece of flannel, and polish with a polishing brush or a big silk duster. This mode of treating floors is quite the best and most wholesome for bedrooms, which should be stained all over, under the beds and everywhere. They can be kept very clean and bright by a daily rubbing with the duster and a weekly application of beeswax and turpentine. Turpentine is cleansing, and floors so treated do not require the weekly scrubbing which is so objectionable in cold and wet weather. Some people object that these floors require so much labor; but after they are once well polished, the labor is not more than scrubbing floors and washing oil-cloths, and they take away two-thirds of the terrors of house-cleaning. Those who like the more common varnished floors should stain the floors as above, but instead of the linseed oil a coat of size should be laid on. This can be obtained at the paint shops, and should be dissolved in boiling water to the consistency of thin gum, and then laid on with the brush evenly and with the grain. When the size is perfectly dry and hard it can be varnished with one or two coats of copal or egg-shell flat varnish. These floors require to be dusted daily, and to have a little linseed oil rubbed in occasionally. These require less care than a waxed floor, but when they get shabby they are not so easily renovated. A flannel bag in which the broom can be incased is the best floor duster and one most easily managed.

WRETCHEDNESS AT CHIOS. — Having just returned from a visit to the island of Chios, of which I stopped at many of the remoter villages during my stay, I feel that something ought to be known about the present condition of places which excited so much commiseration at the time of the earthquake two years ago. The inhabitants of some of these villages at that time lost everything—houses, furniture, and friends—and, as will be remembered, subscriptions enough to keep them alive, say for a month or six weeks, came from all parts of Europe, and blocks of wooden huts were built to shelter them. In these they are still living unable through poverty to rebuild their houses or even to extricate the dead bodies of their friends from the ruins. Many of them are now dying themselves of famine, and the cause of all this present misery is the government of the country. Turkey promised them a year's relief from taxation after the catastrophe, only to put it on double this year; the peasants—in abject misery, some of them—refused to pay and many of these defaulters are now in prison. Turkish troops met the husbandmen in the fields on their way to work and threatened to take away their mules and implements if the taxes were not paid in full; and now the Government is about to erect forts near the principal villages to compel payment. In consequence the villagers have had to sell their goats, their mules and their only means of livelihood; they have had to borrow money at exorbitant rates of interest, and are now in many cases dying of poverty around the ruins of their old prosperity. Not only are the villages which were destroyed by the earthquake subject to this misery, but owing to the destruction of the capital, the decrease in population, and the general poverty, the other agricultural villages have not a sufficient market for their goods and no means of exporting them. The Turkish Government of course say that their own resources will not enable them to treat the Chiotes with the leniency they would desire; that however much they would wish to exempt a population which has suffered from such a terrible disaster from taxation for a brief period, yet they cannot afford it. But why should a helpless, peaceable population of 40,000 Christians, as against 5,000 Turks, be ground down and suffer a prolonged misery far worse than the earthquake because the Turks at Constantinople are in an impoverished condition? The neighboring islands and mainland complain, and perhaps with reason, that they have had no earthquake, no wholesale destruction of everything that belongs to them. If Chios were left to herself for some years she would recover, for her population is one of the most industrious and the most successful in merchandise in the whole of Greece. If she is oppressed for many years longer her population will cease to exist. Six months ago the only printing press in Chios which was not under Government inspection was closed by order of the Sultan. No books, not even for the schools, can now be printed. No one passes through the destroyed villages now the excitement of the earthquake has passed away. Consequently no one knows the abject misery of the place. — *Correspondence of the London Times.*

WE hope to be able to announce in our issue for next Saturday the result of the competition for a "Mechanic's Cottage."

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents heremenlioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

277,952. CONSTRUCTION OF BUILDINGS, SHIPS, ETC. — C. Leo Staub, Pittsburgh, Pa.

278,307. FIRE-EXTINGUISHING APPARATUS. — Daniel Beck, Chicago, Ill.

278,310. FIRE-ESCAPE. — Charles F. Hierbach, Milwaukee, Wis.

278,311. STEAM SUPERHEATER. — William H. Burnet, Newark, N. J.

278,315. FIRE-EXTINGUISHING COMPOUND. — Gustave J. Crikelair, New York, N. Y.

278,323. AUTOMATIC SASH LIFTER AND LOCK. — Charles W. Elliott, Boston, Mass.

278,338. PLANING-MACHINE. — Richard B. Jones, Chicago, Ill.

278,318. SASH-BALANCE. — James W. Lyons, Des Moines, Iowa.

278,405. CARPENTER'S BEVEL. — James B. Cumming and Benjamin F. Van Amringe, Oakland, Cal.

278,439. SASH-HOLDER. — Samuel Lear, Pottsville, Pa.

278,445. HOIST OR ELEVATOR. — Thomas McDonough, Montclair, N. J.

278,481. MATERIAL FOR ROOFING PURPOSES. — Stephen M. Allen, Duxbury, Mass.

278,491. FIRE-PROOF BUILDING. — Wm. L. Black, St. Louis, Mo.

278,528. MEANS FOR CLOSING AND CONTROLLING HOISTWAY-COVERS. — Daniel Fraser, New York, N. Y.

278,539. AUGER. — Harvey Halligan and Harvey Rugg, Seymour, Conn.

278,5 3. WRENCH. — James Houlehan, Toledo, O.

278,558. PRIVY-SINK. — Thomas Kelly, Memphis, Tenn.

278,585. SHUTTER-WORKER. — William A. C. Murphy and John T. Johnston, Springfield, Mo.

278,595. SAFETY-DOG FOR ELEVATORS. — Geo. Pilson, Yonkers, N. Y.

278,597. SELF-CLOSING FAUCET. — Anton Prier, Charles Doherty, and Pierce E. Everett, Kansas City, Mo.

278,603. PILE-DRIVER. — John Roy, New Orleans, La.

278,636. STEAM AND HOT-WATER HEATING-APPARATUS. — Frederic Tudor, Boston, Mass.

278,651. FIRE-ESCAPE. — Abbott L. Aldrich, Boston, Mass.

278,653. AUTOMATIC FIRE-EXTINGUISHER. — Chas. E. Buell, New Haven, Conn.

278,655. FIRE-ESCAPE. — Whitman Chase, North Dighton, Mass.

278,656. COPING FOR WALLS. — Elijah C. Clark, Cannelton, Ind.

278,664. PAINT FOR ROOFING AND OTHER PURPOSES. — Frank Jones, Middlebury, Ind.

278,671. ARTIFICIAL STONE. — James H. Thorp, Baltimore, Md.

SUMMARY OF THE WEEK.

Baltimore.

HOSPITAL. — Mr. Chas. L. Carson, architect, is preparing drawings for a three-st'y building, 55' x 80', for the Nursery and Child's Hospital to be erected cor. Schroeder and Franklin Sts., of brick and stone, and to cost $25,000.

BUILDING PERMITS. — Since our last report thirty-nine permits have been granted, the more important of which are the following:

E. J. Muller, 8 three-st'y brick buildings, s s Dolphin St., between Myrtle Ave. and Shields Alley.

A. A. Sauner, three-st'y brick building, n s Jackson Sq. Ave., between Durham and Wolfe Sts.

W. R. Saumenig, three-st'y brick stable and carpenter-shop in rear, s s Franklin St., between Pine and Chatsworth Sts.

E. Langbammer, three-st'y brick building, w s Patterson Park Ave., between Pratt and Gough Sts.

J. A. Chelton, three-st'y brick building, w s Patterson Park Ave., between Pratt and Gough Sts.

S. E. Eichelberger, 3 three-st'y brick buildings, s s Fayette St., between Pine and Fremont Sts.

A. D. Michael, 6 three-st'y brick buildings, e s Culvert St., between Eager and Read Sts.

Keyser Bros. & Co., three-st'y brick building and basement, s s German St., between South and Calvert Sts.

B. & O. R. R. Co., one-st'y brick building, 57' x 175', at Mt. Clare Station.

Alonzo Lilly, Jr., 6 three-st'y brick buildings, w s McCollough St., n w cor. Presstman St.; and 2 three-st'y brick buildings, n s Presstman St., between McCollough St. and Stoddard Alley.

Chas. Milske, three-st'y brick building, e s Patterson Park Ave., s of Orleans St.

Henry Koesser, three-st'y brick building, s s Haw St., between Fremont and Penn Sts.

Henry Hartman, three-st'y brick building, s e Baltimore St., between Republican and Carey Sts.

Boston.

MONTHLY REPORT. — During the month of May, 31 permits for brick and 87 permits for wooden buildings were issued from the office of Inspector of Buildings, Boston.

BUILDING PERMITS. — *Brick.* — *Portland St., Nos.* 158–164, Ward 7, for Sylvester Bowman, mechanical, 47' and 51' x 60', five-st'y flat; Webster & Dixon, builders.

Otis Pl., No. 12, Ward 9, for Glendower Evans, dwell., 20' x 48', three-st'y mansard; J. J. Whidden & Co., builders.

Court St., Nos. 27 *and* 29, cor. Franklin Ave., Ward 7, for Estate of J. S. Fay, mercantile, 22' and 31' x 85' 6", six-st'y flat; Neal & Preble, builders.

Wood. — *Unnamed St.,* near Centre St., Ward 23, for Mrs. Caroline Lewis, dwell., 30' x 31', two-st'y pitch; Holbrook & Harlow, builders.

Unnamed St., near Centre St., Ward 23, for Mrs. Caroline Lewis, dwell., 30' x 32', two-st'y pitch; Holbrook & Harlow, builders.

Lexington St., Nos. 221–225, for Lewis Burnham, 2 dwells., 21' 6" x 31', and 17' x 23', two-st'y mansard.

Pierce Ave., opposite Plain St., Ward 24, for Thos. Brady, dwell., 26' x 36', two-st'y pitch; H. P. Oakman, builder.

Perrin St., cor. Waverly St., Ward 21, for Francis N. White, dwell., 24' 10" and 33' x 63' 2", two-st'y pitch; Amos D. Gould, builder.

Granite St., nearly opposite Mt. Washington Ave., Ward 13, for J. O. Whitney & Co., storage, 62' x 90', one-st'y flat; M. W. Tate, builder.

Dorset St., rear, near Dorchester Ave., Ward 15, for Henry H. Hawley, stable, 20' x 24', one-st'y pitch; Jerome Keene, builder.

Union Ave., rear, near Washington St., Ward 23, for Michael Maloney, stable, 16' x 22', one-st'y pitch.

Greenwood Ave., Ward 23, for Joseph Johnson, wagon-shed, 17' x 35', one-st'y flat; John D. Wester, builder.

Lexington St., No. 235, Ward 1, for Howard Woodside, dwell., 21' x 21' and 16' x 24', one-st'y mansard; Wilbur Goodwin, builder.

Brooklyn.

BUILDING PERMITS. — *North Seventh St.,* s s, 150' e Fifth St., three-st'y brick factory, gravel roof; cost, $5,300; owner and builder, J. B. Chamberlain; architect, F. Weber.

Beaver St., No. 8, n s, 80' e Flushing Ave., one-st'y frame store and dwell., tin roof; cost, $1,000; owner, Benj. Tuckers, on premises; architect, T. Engelhardt.

Herkimer St., n e cor. Saratoga Ave., 6 two-st'y frame dwells., gravel roofs; cost, each, $2,300; owner, G. H. Bishop, New York; architect, G. H. Chamberlain.

Lafayette Ave., s s, 150' e Grand Ave., 4 three-st'y brick dwells., tin roofs; cost, each, $7,500; owner, H. G. Cootey, 108 Park Pl.; architect, P. I. Cootey; builders, J. Carlin and B. Brown.

Ten Eyck St., No. 210, s s, 150' e Humboldt St., three-st'y frame store and tenement, tin roof; cost, $4,000; owner and builder, Peter Kaiser, on premises; architect, T. Engelhardt.

Water St., s s, about 100' e Main St., 2 five-st'y brick factories, tile and slate roofs; cost, total, $35,000; owners, Campbell & Thayer, 89 Maiden Lane, New York; architects, Post & McCord; builder, J. Guilfoyle.

Stagg St., s s, 125' e Bushwick Ave., three-st'y frame double tenement, gravel roof; cost, $5,000; owner, William Dresh, Scholes St.; architect, J. Platte; builders, —— Buckheid and Ochs & Son.

Prospect Pl., n s, 37' e Vanderbilt Ave., 4 three-st'y brick dwells., gravel roofs; cost, each, $5,000; owner, W. H. Hinman, New York; architect, T. G. Thomas; builder, —— Tremble.

Kosciusko St., No. 448, two-st'y frame double tenement, tin roof; cost, $3,000; owner, —— Reynolds, on premises; builder, J. Rueger.

Hancock St., n s, 180' e Nostrand Ave., 2 three-st'y brownstone front dwells.; also, *Hancock St.,* n s, 340 e Nostrand Ave., 2 three-st'y brownstone front dwells., tin roofs; cost, each, $9,000; owner, Geo. Phillips, 177 Hancock St.; architect, J. G. Prague.

Dikeman St., s s, 62' w Van Brunt St., three-st'y brick double tenement, tin roof; cost, $7,000; owner, Christian Hoehl, Van Brunt St., cor. Dikeman St.; architect, T. Liebbrand; builders, P. Kelly & Son and Gibson & Liebbrand.

Leonard St., w s, 78' n Nassau Ave., three-st'y frame tenement, tin roof; cost, $4,000; owner, Jno. Jones, 108 Eckford St.; architect, F. Weber; builders, G. J. Roberts and A. H. Hulse.

Ralph Ave., n e cor. Marion St., three-st'y frame store and tenement, tin roof; cost, $4,000; owner, Philip Stebler, Marion St., near Ralph Ave.; builder, J. Pirring.

North Eighth St., n s, 150' e Third St., four-st'y brick double tenement, tin roof; cost, $8,000; owner, Thos. Monachan, 141 North Eighth St.; architect, T. F. Houghton; builders, M. Smith and J. Doig, Jr.

Clinton St., n w cor. President St., 8 three-st'y brownstone front dwells., six on Clinton St. and two on President St., tin roofs; cost, each, $6,500; owner, Julius Wadsworth; architect and builder, Geo. Lowden.

Kane Pl., e s, 75' s Herkimer St., three-st'y frame tenement, tin roof; cost, $3,000; owner, Margaret Karrer, 1908 Fulton St.; builder, J. Dhuy.

Vernon Ave., s s, 133' e Marcy Ave., 6 two-and-a-half-st'y brownstone front dwells., tin roofs; cost, each, $5,000; owner, architect and builder, Patrick Sheridan, 775 Myrtle Ave.; carpenter, Wm. Colsted.

Van Buren St., s s, 150' w Sumner Ave., 7 two-st'y brownstone front dwells., tin roofs; cost, each, $4,000; owner, Patrick Concannon; architect, I. D. Reynolds.

Chicago.

APARTMENT-HOUSE. — Bauer & Hill, architects, have plans ready for an apartment-house, cor. of Groveland Park Ave. and Twenty-eighth St., three stories and cellar, pressed-brick, with stone finish; Ex-Alderman Jacob Rosenberger, owner.

CHURCH. — The Baptist church to be built on Fullerton Avenue, near Lincoln Park, will be of pressed-brick, with cut-stone finish; it will cost $25,000. J. C. Cochran, architect.

CLUB-HOUSE. — Work on the Union Club-House is to be pushed as rapidly as possible, and the club expects to occupy it by October 1; cost will be about $100,000.

FLATS. — Silsbee & Kent, architects, have prepared plans for Mr. B. F. Norris for 2 three-st'y flats, one to be built on Oak St., and the other on Ogden Ave. They are to be of pressed-brick, with brownstone and terra-cotta finish, in Moorish style of architecture, and will cost $12,000 each.

HOUSES. — Silsbee & Kent have furnished plans to Mr. J. V. Weaver for a house on Illinois St., to be three stories and basement, of pressed-brick, and will cost $7,000.

Mr. J. C. Cochran, architect, has plans ready for frame house for T. W. Wilmarth, at Ravenswood.

By same architect, 2 brick houses, cor. of Monroe St. and Winchester Ave., for Mr. I. W. Litchfield; cost, $20,000.

INSURANCE OFFICE BUILDING. — Work has been begun on Jackson St., w of Lasalle St., demolishing the old building, for the purpose of erecting on the lot a new building for the Royal Insurance Company, of Liverpool and London. The building will be ten stories high on both streets. Four stories of the Jackson-street front will be of red granite, and red dressed sandstone for the remainder. Quincy-street front will be granite three stories, and red pressed-brick, terra-cotta finish, for the other seven stories. Steel floor-beams and hollow-tile arches throughout the building. To be absolutely fire-proof, and completed in one year; cost, $500,000; W. W. Boyington, architect.

STORES. — Mr. W. W. Boyington will build for David Coey, cor. of Eighteenth St. and Wabash Ave., three-st'y brick structure, nine stores, and the upper stories will contain eighteen flats; cost, $70,000.

BUILDING PERMITS. — W. Bucktaniel, three-st'y brick dwell., 22' x 60', 178 Rumsey St.; cost, $3,000.

Wm. Dressler, three-st'y brick dwell., 22' x 50', 3516 Wentworth Ave.; cost, $3,500.

Busse & Brown, 2 two-st'y brick dwells., 44' x 50', 353–355 Marshfield Ave.; cost, $5,000.

J. C. McCullom, six-st'y basement brick warehouse, 50' x 80', 238–240 Market St.; cost, $30,000.

M. Harrigan, 2 two-st'y brick dwells., each 22' x 46', 149–151 Paulina St.; cost, $5,400.

Peter Becker, three-st'y basement and attic brick dwell. and store, 26' x 80', 475 South Halsted St.; cost, $7,000.

J. McLaren, two-st'y basement brick dwell., 40' x 60', 339–341 Ashland Ave.; cost, $10,000.

K. Eishengreen, 2 two st'y brick dwells., 48' x 64', 736–740 Congress St.; cost, $10,000.

Campbell Bros., 6 two-st'y brick dwells., 36' x 125', 382–392 Leavitt St.; cost, $15,000.

David Coey, three-st'y basement brick stores and flats, 70' x 166', Wabash St., cor. Eighteenth St.; cost, $40,000.

John Fitzgibbon, two-st'y brick store and dwell., 25' x 70', 721 Elston Ave.; cost, $4,000.

J. Webb, 3 two-st'y brick flats, 40' x 61', 310 to 314 South Leavitt St.; cost, $10,000.

J. Cohen, 3 three-st'y brick dwells., 60' x 74', 46–50 Wisconsin St.; cost, $25,000.

Jacob Roeder, two-st'y brick dwell., 22' x 56', 394 Webster St.; cost, $5,000.

Geo. Hewitt, two-st'y brick flats, 20' x 51', 50 Warren Ave.; cost, $4,700.

H. J. Berry, three-st'y brick factory, 44' x 80', Indiana St., cor. Market St.; cost, $10,000.

F. Kuratkewsky, two-st'y brick dwell., 21' x 46', 173 Dayton St.; cost, $3,000.

Aug. Kershoff, two-st'y brick dwell., 21' x 65', 709 Halsted St.; cost, $4,000.

M. Dunn, two-st'y brick dwell., 22' x 49', 398 Loomis St.; cost, $3,300.

Chas. Waxon, two-st'y brick dwell., 21' x 63', 156 Centre Ave.; cost, $3,500.

L. S. Anderson, two-st'y basement brick dwell., 21' x 49', 94 Lincoln Ave.; cost, $3,400.

Allen B. Wrisley, five-st'y brick factory, 50' x 100', 479–481 Fifth Ave.; cost, $15,000.

R. Truman, 5 two-st'y brick dwells., 46' x 100', 2900–2908 Vernon Ave.; cost, $12,500.

R. Rahn, two-st'y basement brick dwell., 21' x 48', 3830 Dearborn St.; cost, $3,000.

John Rawle, two-st'y brick dwell., 21' x 52', 3630 Dearborn St.; cost, $4,000.

M. Pelton, three-st'y brick building, 24' x 100', 490 Milwaukee St.; cost, $9,000.

H. Mueker, two-st'y brick dwell. and stores, 22' x 45', 475 West Twelfth St.; cost, $4,000.

J. C. Waltz, three-st'y basement and attic brick flats, 45' x 57', 379 Chestnut St.; cost, $12,000.

Mrs. E. Fabion, 4 two-st'y basement and attic brick dwells., 50' x 66', Chestnut St., cor. Wells St.; cost, $15,000.

A. C. Lauston, three st'y basement brick stores and flats, 50, x 80', Milwaukee Ave.; cost, $12,000.

John Livingston, three-st'y basement brick store and dwell., 25' x 60', Milwaukee St., near Wood St.; cost, $6,000.

Peter Mehler, two-st'y basement brick flats, 46' x 54', 897–899 South Ashland Ave.; cost, $8,000.

Dr. S. Sawyer, three-st'y basement brick store and flats, 66' x 68', 193–197 North Ave.; cost, $16,000.

Commercial Safety Company, five st'y basement and attic brick office-building, 90' x 131', cor. Dearborn and Monroe Sts.; cost, $200,000.

J. L. Hathway, brick shelter-shed, 160' x 280', Kingsberry St., cor. Indiana St.; cost, $10,000.

E. W. Morrison, three st'y brick flats, 56' x 75', 12–14 Elizabeth St.; cost, $18,000.

Cincinnati.

HOUSE. — C. F. Loudon, Esq., is to build a stone house on Walnut Hills, from plans prepared by James W. McLaughlin; cost, $20,000.

BUILDING PERMITS. — F. A. Heleman, three-st'y brick building, cor. Eighth and Carr Sts.; cost, $8,000.

Fred. Otte, three-st'y brick dwell., Western Ave., near Dayton St.; cost, $4,000.

J. N. Plakes, two-st'y brick building, State Ave., near Eighth St.; cost, $3,500.

Echert Bros., four-st'y brick store, Pearl St., near Broadway; cost, $6,500.

Anton Lambar, three-st'y brick building, Dandridge St.; cost, $5,500.

Henry Hockemeyer, three-st'y brick building, cor. of Harriet and Espanola Sts.; cost, $3,500.

Amelia Weinhardt, two-st'y brick building, Loth St., near Mulberry St.; cost, $3,000.

C. Weibel, two-st'y brick building, McMillan St., near Vine St.; cost, $4,000.

M. M. White, two-st'y brick building, Sixth St., between Race and Elm Sts.; cost, $4,000.

S. Schomaker, three-st'y brick building, 565 Walnut St ; cost, $3,600.

A. Segal, 2 two-st'y brick buildings, Court St., between Baymiller and Linn Sts.; cost, $8,000.

A. Segal, two-st'y brick dwell., Richmond St.; cost, $4,000.

Fritch & Blettner, three-st'y brick building, n w cor. McMicken Ave. and Henry St.; cost, $12,000.

Wm. Miller, two-st'y brick dwell., Clifton Ave.; cost, $3,500.

St. Paul P. E. Church, cor. Seventh and Plum Sts.; cost, $5,000.

New York.

Chapel. — For the South Reformed Church, a chapel, with class-rooms below, is to be built on Twenty-eighth St., between Eighth and Ninth Aves. It is to be of brick, and open-timbered roof; Mr. H. Edwards-Ficken is the architect.

Factory. — For the Scovill Manufacturing Company a seven-st'y building, about 25' x 100', is to be built on Broome St., near Crosby St., from designs of Messrs. D. & J. Jardine. It will be built of brick, with terra-cotta and stone finish, will be partly fireproof, and cost about $50,000.

Industrial School. — For the Children's Aid Society a building, 44' x 85', is to be built on the cor. of Seventh Ave. and Thirty-second St., at a cost of about $40,000. It is to be five stories high, and is the gift of Mr. Astor.

Stable. — For Messrs. Birdsall & Johnson a six-st'y stable, with basement, to accommodate one hundred and fifty horses, is to be built at Nos. 159 and 161 Crosby St., from designs of Messrs. Berger & Baylies, at a cost of about $30,000.

Building Permits. — *One Hundred and Eleventh St.*, s s, 275' w Second Ave., four-st'y brick tenement and store, tin roof; cost, $14,000; owner, Josephine H. Jenny, 68 East One Hundred and Tenth St.; architect, A. Spence.

Seventy-seventh St., s s, 100' w Second Ave., three-st'y brick stable, tin roof; cost, $7,000; owner, A. H. Jonas, 71 Attorney St.; architect, J. C. Burne.

One Hundred and Twenty-second St., s s, 100' e Seventh Ave., 8 four-st'y brownstone front dwells., tin roofs; cost, each, $18,000; owner, A. Alonzo Teets, 208 West One Hundred and Twenty-fifth St.; architects, Cleverdon & Putzel.

One Hundred and Twenty-eighth St., n s, 100' e Fifth Ave., 4 three-st'y brownstone front dwells., tin roofs; cost, each, $15,000; owner, Isaac E. Wright, 1983 Madison Ave.; architects, Cleverdon & Putzel.

One Hundred and Thirty-seventh St., s s, 430' w Sixth Ave., three-st'y brick dwell., tin roof; cost, $7,500; owner, Wm. J. Chaloner, 227 West One Hundred and Thirty-second St.; architect, F. A. Peterson; builders, Jas. B. Smith & Prodgers.

Morris Ave., s e cor. West Prospect Ave., 4 two-and-a-half-st'y frame dwells., tin and slate roofs; cost, $3,000; owner, John Litter, 351 Fourth Ave.; architect and carpenter, J. M. Dubois; masons, Lennon & Son.

One Hundred and Fifteenth St., n s, 150' w First Ave., 4 five-st'y brick tenements and stores, tin roofs; cost, each, $14,000; owner, Margaret Schmitt, 428 West One Hundred and Twenty-second St.; architect, Geo. M. Walgrove; builder, Frank Schmitt.

Eldridge St., Nos. 11 and 13, 2 five-st'y brick tenements and stores, tin roofs; cost, each, $17,000; owner, Ernst Von Au, 149 Adam St., Brooklyn; architect, Jobst Hoffman.

Fifth Ave., e s, 51' 2½" n Seventy-fifth St., four-st'y brick dwell., stone front, slate roof; cost, $60,000; owner, Alfred M. Hoyt, 40 West Thirty-seventh St.; architects, McKim, Mead & White; builder, John J. Tucker.

Jacob St., Nos. 19, 21 and 23, and No. 59 Frankfort St., six-st'y brick store, tin roof; cost, $35,000; owner, G. B. Horton, 93 Gold St.; architect, Wm. B. Tubby.

Rivington St., No. 17, six-st'y brick flat and store, tin roof; cost, $25,000; owner, R. Heiber Breintnall, Newark, N. J.; architect, Thos. Cressey.

Sixth Ave., s w cor. One Hundred and Twenty-eighth St., 6 four-st'y brick dwells., tin roofs; cost, each, $10,000; owner, Estate of Sylvester Brush, Lewis S. Brush, exr., 40 West Seventeenth St.; architect, H. S. Hardenbergh; builder, Samuel Lowden.

One Hundred and Twenty-eighth St., s s, 75' w Sixth Ave., 3 four-st'y brick double houses, tin roofs; cost, each, $10,000; owner, architect and builder, same as last.

West Forty-third St., Nos. 313 to 319, six-st'y brick carriage-factory, tin roof; cost, $50,000; owners, Healey, Williams & Co., 1478 Broadway; architect, John Sexton.

Fifty-eighth St., s s, 100' e Fifth Ave., 2 six-st'y brick flats, tin roofs; cost, each, $1 0,0 0; owner, Mary Mason Jones, 1 East Fifty-seventh St.; architect, Robert Mook; builders, John J. Tucker and John C. Hamilton.

Hester St., n e cor. Clinton St., five-st'y brick tenement and store, tin roof; cost, $20,000; owners, Moore & Wilson, 3 3 East Seventy-ninth St.; architects, Thom & Wilson.

West Sixteenth St., Nos. 136 to 142, 2 five-st'y brick flats, tin roofs; cost, each, $30,000; owners and architects, same as last.

Twelfth St., No. 21, n s, four-st'y brick stable, gravel roof; cost, $14,000; owner, Edward Smith, 151 Greenwich St.; carpenter, J. G. McMurray.

Twenty-first St., s s, 350' w Tenth Ave., 2 four-st'y brick tenements, tin roofs; cost, each, $12,000; lessee, Clinton Sutphen, Mount Vernon, N. Y.; architect, Geo. B. Pelham.

Washington St., n e cor. Clarkson St., five-st'y brick store, tin roof: cost, $15,000; lessee, David Milleman, 361 West Fifty-fifth St.; architect, J. M. Forster.

Centre St., s e cor. Walker St., seven-st'y brick store, metal roof; cost, $45,000; owner, P. R. Weiler, 693 Madison Ave.; architect, J. B. Snook; builder, not selected.

West Thirty-sixth St., No. 521, four-st'y brick dwell., tin roof; cost, $5,051; owner, Henry T. Nichols, 38 Beaver St.; architect, M. Thomas; builders, Morris & Seluver.

Second Ave., n w cor. Seventy-first St., 4 five-st'y brownstone front tenements and stores, tin roofs; cost, three, each $12,000, and one $15,000; owner, Fred. J. Hefner, Jersey City, N. J.; architect, Jos. M. Dunn; mason, Frank A. Seitz.

Seventy-second St., n s, 113' w First Ave., 5 four-st'y brownstone front tenements, tin roofs; cost, each, $16,000; owners, Frame & McGirr, 114 and 116 East Seventieth St.; architect, G. A. Schellinger.

One Hundred and Twenty-seventh St., s s, 105' e Third Ave., 3 five-st'y brick tenements and stores, tin roofs; cost, each, $18,000; owner, John Keyes, 61 East One Hundred and Twenty-seventh St.; architect, Thos. E. S. Dwyer; builders, McManus & Burney and Thos. E. S. Dwyer.

Sixty-first St., n s, 149' 6" e Second Ave., 2 five-st'y brick tenements, tin roofs, cost, each, $12,000; owner, Margaret C. Smith, 1704 First Ave.; architect, A. B. Ogden.

Forty-seventh St., n s, 300' w Tenth Ave., two-st'y brick dwell. and store, tin roof; cost, $3,500; owner, Henry Reinmuller, 659 Tenth Ave.; architect, C. F. Ridder, Jr.; builder, not selected.

Sixty-second St., n s, 81' 5" e First Ave., five-st'y brick factory, tin roof; cost, $24,0 0; owner, Sarah E. Hinman, 237 West One Hundred and Thirty-first St.; architect, J. H. Valentine; builder, S. Hinman.

Twenty-first St., s s, 75' w Eleventh Ave., one and part two-st'y brick factory, tin and corrugated-iron roof; cost, $5,000; lessee, Wm. Collins, Bogert St.; architect, Wm. Kuhles.

One Hundred and Sixth St., n s, 100' w First Ave., 3 four-st'y brick tenements and stores, tin roofs; cost, each, $13,000; owner, Wilhelmine Juch, 351 East One Hundred and Fourth St.; architect, Arthur Arctander.

First Ave., e s, 55' s One Hundred and Twenty-fourth St., 3 five-st'y brick tenements and stores, tin roofs; cost, each, $16,000; owner and builder, Joseph E. McCormack, No. 1 Lincoln Pl.; architect, M. V. B. Ferdon.

One Hundred and Twenty-fourth St., s s, 100' e First Ave., 6 five-st'y brick tenements, tin roofs; cost, each, $16,000; owner, builder and architect, same as last.

Alterations. — *Fulton St., Nos. 206 and 208*, raise two stories; cost, $10,700; owner, Martin B. Brown, 770 Lexington Ave.; builder, Henry Wallace.

Twenty-third St., s e cor. Sixth Ave., Booth's Theatre, alter building externally and internally for business purposes; cost, $200,000; owner, James D. Fish, 78 Wall St.; architect, Ed. H. Kendall; builders, Warren A. Conover and A. G. Bogert & Bros.

East Houston St., Nos. 96 and 98, front altered and internal alterations; cost, $15,000; owner, F. Krutina, 854 Lexington Ave.; architect, Julius Kastner.

Eleventh Ave., n w cor. Twentieth St., four-st'y brick extension and one-st'y extension; cost, $4,000; owner, Herman Meyer, on premises; architect, Julius Boekell.

King St., Nos. 37 and 39, rear, build brick partition wall, rebuild front wall; cost, $4,000; owner, Wm. Cleary, Fifty-third St., cor. Sixth Ave.; architect, Henry J. Dudley.

West Fifty-third St., No. 57, two-st'y and basement extension; cost, $3,500; owner, John M. Toucey, on premises; architect, J. C. Snook; builder not selected.

West Thirty-ninth St., No. 622, two-st'y brick extension; cost, $3,000; owner, James P. Robertson, 431 West Forty-seventh St.; architects and carpenters, Axford & Cramer; mason, E. O. Perrine.

Broadway, e s, between Tenth and Twelfth Sts., Grace Church, brick, marble and iron spire; cost, $60,000; owners, rector, church warden and vestrymen of Grace Church: architects, Renwick, Aspinwall & Russell; builders, Jno. J. Tucker and Vermont Marble Co.

West Fifty-third St., No. 63, one-st'y brick extension; cost, $5,000; owner, Sarah L. Heuvelman, on premises; architect, Thos. Stent.

Fourth Ave., n w cor. Sixty-third St., four-st'y brick extension; cost, $5,000; owner, Emanuel Arnstein, on premises; architect, F. S. Barus; builder not selected.

Twenty-third St., s e cor. Lexington Ave., New York College, one-st'y extension; cost, $20,000; owner, City of New York, Stephen A. Walker, Chairman Board of Trustees, 8 East Thirtieth St.; architect, W. Wheeler Smith; builder, Richard Deeves.

Broad St., Nos. 11 to 21, and Exchange Pl., Nos. 53 and 55, ten-st'y brick extension; cost, $100,000; owner, Darius O. Mills, 634 Fifth Ave.; architect, G. B. Post; builder, D. H. King, Jr.

Front St., No. 152, front and rear walls taken down and rebuilt, new flat roof, internal alterations, etc.; cost, $5,000; owner, John A. Casey, 142 Maiden Lane; architect, James H. Giles.

Ninth Ave., s w cor. One Hundred and Eighth St., new chimney-stack; cost, $12,000; lessee, Bernheimer & Schmid, on premises; architects, Lederle & Co.

Philadelphia.

Factory. — Messrs. Campbell & Rickards propose to erect, at n w cor. Huntingdon and Pope Sts., a six-st'y manufacturing building, 38' x 87' 10".

Wages. — Plasterers are agitating the question of fifty cents per day advance.

Building Permits. — *Green St.*, cor. Queen St., three-st'y dwell., 18' x 44'; Wm. Keyser, owner.

Edgemont St., e s, n Anthracite St., two-st'y dwell., 15' x 40'; Geo. McCouch, contractor.

Wolf St., n s, w Sixth St., 7 two-st'y dwells., 16' x 30'; W. J. Smith, contractor.

Little Wayne St. Nos. 4923 and 4925, 2 three-st'y dwells., 15' x 30'; Valentine Stokes, owner.

Mutter St., e s, s Somerset St., three-st'y dry-house, 19' x 50'; Joseph Hanson, owner.

Terrace St., bet. Cedar St. and Shur's Lane, 2 two-st'y dwells., 15' x 30'; Jno. Harper, owner.

Fleming St., s s, bet. Cotton and Grape Sts., 3 two-st'y dwells., 13' x 44'; Henry Gray, contractor.

Haines St., s e s, bet. Hancock St., and Germantown Ave., two-st'y store and dwell., 18' x 34'; Geo. Hearst, contractor.

Poplar St., n w cor. Carlisle St., 2 three-st'y dwells., 20' x 61'; Jos. Stuckey, contractor.

Reese St., e s, n Cumberland St., two-st'y dwell., 13' x 40'; Wm. Tecklenberg, contractor.

Scott St., No. 1938, two-st'y dwell., 16' x 26'; Jno. Spoerl, contractor.

Otis St., s s, e Memphis St., and n s Moore St., 10 three-st'y dwells., 16' x 40'; Chas. Martin, owner.

South Eighth St., No. 1704, two-st'y dwell., 16' x 42'; H. C. Mintzer, owner.

Carnarvon St., w s, bet. Dickinson and Tasker Sts., two-st'y dwell., 14' x 28'; Jas. Dempsey, owner.

Brown St., s s, bet. Twenty-seventh and Taney Sts., 12 three-st'y dwells., 15' x 43'; Jacob Ridgeway.

Stella Ave., n s, n Emerald St., two-st'y dwell., 16' x 45'; C. G. Harris.

Mifflin St., s s, e Ridge Ave., three-st'y dwell., 15' x 43'; Chas. Bartle, contractor.

Mascher St., s w cor. Venango St., two-st'y dwell., 14' x 30'; Job Rutty, contractor.

Greene St., No. 1814, two-st'y stable., 32' x 36'; Nutz & Worthington, contractors.

Warnock St., w s, s Columbia Ave., 2 two-st'y dwells., 17' x 38'; C. Bachle, contractor.

Nineteenth St., e s, n Reed St., one-st'y chapel, 25' x 48'; Kramer & Huston, contractors.

Paul St., s w cor. Rann St., police station, 40' x 103'; Thos. A. Lynch, contractors.

Fairhill St., w s, s Huntington St., two-st'y dwell., 17' x 42'; F. Hefling, contractor.

Ashmead St, n s, e Mercer St., two-st'y dwell., 15' x 38'; Wm. Garvin, contractor.

Thirty-fourth St., s e cor. Race St., three-st'y dwell., 28' x 44'; Wm. Lamb, contractor.

Davis St., n e cor. Germantown Ave., third-st'y addition to front and second-st'y addition to back building, 18' x 70'; J. G. Henvis, owner.

Second St., e s, n Norris St., 2 three-st'y stores and dwells., 18' x 48'; Wm. Bartholomew, contractor.

Palethorp St., w s, n Norris St., 2 two-st'y dwells., 18' x 36'; Wm. Bartholomew, contractor.

Spring Garden St., n s, e Seventeenth St., school-house, 45' x 100'; P. H. Somerset, contractor.

Bodine St., w s, s Dauphin St., second and third-st'y add. to factory, 32' x 64'; Jas. Cooney.

Pine St., No. 212, two-st'y back building, 20' x 40'; H. Nichols, owner.

Tulip St., w s, n Palmer St., four-st'y factory, 30' x 77'; Jos. Young, contractor.

Franklin St. Nos. 1428, 1430, 1432 and 1434, 4 three-st'y dwells., 17' x 70'; Daniel Buck, owner.

Kitchen's Lane, e Ridge Ave., 2 two-st'y dwells., Jacob Ketteuring, owner.

Fifth St., e s, s Susquehanna Ave., three-st'y dwell., 17' x 40'; C. H. W. Keyser, contractor.

Dickinson St., No. 210, one-st'y carriage-house, 32' x 63'; Benj. Hunt.

Twenty-first St., s w cor. Bainbridge St., two-st'y stable, 18' x 22'; J. & S. Gardner, owners.

Frankford Road, No. 3412, three-st'y dwell., 16' x 30'; G. W. Jackson, owner.

Venango St., s s, w Twenty-second St., 4 three-st'y dwells., 17' x 50'; Jno. Duncan, contractor.

Palethorp St., e s, n Dauphin St., 3 two-st'y dwells., 12' x 28'; Wm. F. Shaw, owner.

Crown St., s e cor. Vine St., two-st'y factory, 48' x 66'; C. Bachle, contractor.

Sixth St., e s, bet. Wharton and Reed Sts., 12 three-st'y dwells., 16' x 48'; A. M. Green, owner.

Hanley St., e s, bet. Wharton and Reed Sts., 4 two-st'y dwells., 15' x 30'; A. M. Green, owner.

Hanley St., w s, bet. Wharton and Reed Sts., 8 two-st'y dwells., 15' x 30'; A. M. Green, owner.

Marriott St. Nos. 420 and 422, 2 two-st'y dwells., 15' x 28'; Samuel Elliott.

Mulberry St., e s, bet. Ward and Baker Sts., two-st'y dwell., 17' x 44'; Jno. W. Elton, contractor.

Terrace St., w s, n Saville St., three-st'y dwell., 17' x 32'; McIlwain & Cunningham, contractors.

Dobson's Mills, cor. Ridge Ave and Scott's Lane, three-st'y store-house, 40' x 140'; J. Dobson, owner.

Queen Lane, s s, bet. Ridge Ave. and Railroad, 2 three-st'y dwells., 13' x 24'; Jno. Dobson, owner.

Woodvale Ave., cor. Ridge Ave., 9 two-st'y dwells., 16' x 44'; A. A. Harmer, owner.

Prospect Ave., near Ridge Ave., three-st'y dwell., 16' x 42'; J. P. Scherf, owner.

Broad St., s e cor. Hamilton St., one-st'y foundry, and four-st'y machine-shop, 55' x 109' and 40' x 55'; Kister & Oram, contractors.

Permits issued during May, 653.

Bids and Contracts.

Baltimore, Md. — The following bids for iron-work for the court-house and post-office were opened May 23: Haugh, Ketcham & Co., $6,578.31; Bartlett, Hayward & Co., $6,375; Vandenbeck, $6,954; Wendel Bollman, $5,852.50; Snead & Co., $7,05·.96; Phœnix Iron Co., Trenton, $7,913.79; H. A. Ramsay & Co., $6,495; no awards.

Cleveland, O. — The contracts for building the Fourteenth Ward Fowler School Building have been awarded, and the foundations are already laid. Contractors are as follows: mason-work, F. H. Eggers, $29,850; carpenter-work, C. A. Merritt, $14,843; galvanized iron and tin, Parkin & Ryan, $1,443; slating, Auld & Conger, $1,470; painting, A. & W. Kyle, $1,107; heating and ventilating, Smith & Connors, $9,510.75. Total, $58,223.75.

Paducah, Ky. — The following is a synopsis of bids for furnishing glass for post-office: De Paw, $899; E. A. Boyd, $1,008.18, to be completed in two weeks; Crystal Plate Glass Company, $1,067.37, to be completed in three weeks; John Gibson, $1,275; William Glenny, $1,390, to be completed in six weeks. No awards.

Philadelphia, Pa. — The following is a synopsis of bids opened for encaustic floor-tiling for court-house and post-office: Edw. Boote, $135.50; United States Encaustic Tile Company, $118.90; William L. Wilson, $102.92; American Encaustic Tile Co., $105; Sharpless & Watts, $113; John Gibson, $125. No awards.

Topeka, Kan. — The following is a synopsis of bids for heating-apparatus for the court-house, etc.: Samuel J. Pope & Co., $13,479; Bartlett, Hayward & Co., $15,488; Brooks & Kemper, $15,700; Frederick Tudor, $16,667. The bid of Samuel J. Pope & Co., $13,479, the lowest, has been accepted.

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AN informal notice has been given that the Seventeenth Annual Convention of the American Institute of Architects will be held in Providence and Newport, R. I., on the 29th, 30th and 31st of August next. The time has been set much earlier in the year than usual, in order that visitors may see the two beautiful cities where the Convention is to be held at their most brilliant season. The committee of arrangements have succeeded in devising a most attractive programme of mingled business and pleasure. The first day's session will be held in Providence, the Convention meeting for the usual business in the forenoon, and for adjourned matters and papers in the evening, the time between being occupied by a drive about the city. During the forenoon of the second day the regular business will probably be nearly or quite completed, and the Convention will adjourn to Rocky Point for dinner; proceeding later by steamer to Newport, where an evening session will be held in the picturesque Casino. The third day will be devoted to enjoyment, the members spending the forenoon in driving over the town, to separate finally in the afternoon, after a lunch at the Casino. The committee call upon all members of the Institute to assist in making the meeting of the Convention as interesting and successful as possible, and ask particularly for papers on topics of professional interest. There are so many architects who have within the past year or two experienced or observed something which their fellows would like to know about that it ought to be an easy matter to secure material of great value; but to make sure of this result every member of the Institute should ask himself whether he is not bound to contribute some of the information which he has acquired in return for that which he expects to gain from others.

THE dispute between the master masons of Chicago and the Bricklayers' Union, after even more than the usual amount of ridiculous boasting, recrimination, bad faith and mendacity, has virtually terminated, in an order which "permits" the members of the Union to go to work again at the wages offered them, "provided they refuse to work under the non-Union foremen," the last clause being, of course, nothing more than one of the characteristic pretences by which the self-constituted leaders of such bodies endeavor to deceive people who do not know them into the idea that they possess some authority. The last hours of the strike were enlivened by the confession of a penitent Union man, who came to the house of the Secretary of the Master Masons' Association at midnight, and woke him up to tell him that he had circulated false reports about him to injure his character, and having lost his peace of mind in consequence had come to him in the hope of regaining it by the acknowledgment of his fault. The unsympathizing Secretary told the culprit in reply that it was quite unnecessary for him to waste his time in going about confessing himself to be a liar, since everybody knew that already; and dismissed him without much ceremony. It is much to be hoped that an understanding having been reached, the building trades in Chicago will enter upon a new season of profitable activity.

ANOTHER strike, in Massachusetts, has practically ended in a different, and much less satisfactory way. For some time the operatives in certain shoe manufactories in the town of Marblehead have been engaged in a dispute with their employers, and have used against them the customary practices of intimidating those who were willing to work for the wages which they refused, and threatening and endeavoring to injure those of their fellow workmen who remained faithful to their duty toward their employers and their own families. The operatives control a large number of votes, and the town government, in abject terror of their influence, refused to do anything to protect the employés or property of the manufacturers, who, finding themselves on the verge of ruin, at last resolved to take the only course open to them, and remove their business and their machinery to another State. The transfer is already completed in some cases, and in a few days all the aggrieved manufacturers will be gone, leaving their operatives to seek some other means of living, since they would have it so, as best they can; and the foolish town government to mourn the loss of a goodly portion of its heaviest tax-payers, and to provide betimes for the support of the army of paupers which it has so efficiently helped to create within its jurisdiction.

THE question of the responsibility of architects is likely to be raised in an interesting form in relation to the repairs of the stone ceiling of the Assembly Chamber in the new State Capitol of New York. It will be remembered that a commission appointed to examine and report upon the security of this ceiling, although it found no defect involving imminent danger to the structure, advised its removal: and most of our readers will also remember that the architects of the new part of the building, Messrs. Eidlitz and Richardson, united in the production of a very able reply to the report of the Commission, protesting against the demolition of their work; and in connection with this made an offer, which was accepted, to do at their own expense any work of consolidation or repair which might be necessary to make the ceiling absolutely secure. The cost of the work done in carrying out this proposition was about three thousand dollars, which Messrs. Eidlitz and Richardson paid; but at the subsequent session of the State Legislature a bill was introduced, praying that they might be reimbursed for their outlay. So far as it is now possible to judge, the friends of the architects seem quite justified in asking for them the repayment of money spent rather in deference to an unreasonable panic than in remedying any fault or mistake of their own; but, although both houses of the Legislature passed the bill, it was vetoed by the Governor. It is, of course, probable that the matter will come up again next year, and its discussion may perhaps reopen the whole question of the proper or improper construction of the vault, which has hardly yet been satisfactorily settled.

WE have been favored with a copy of what would be called by some persons an "invitation to architects," announcing, in rather ungrammatical language, that the Commissioners of the Territory of Dakota thereto authorized will on the fifth day of July, 1883, "receive plans and estimates for a capitol building," to cost when completed not more than three hundred thousand dollars, "which said building shall be designed as the main or central part of a larger edifice, and the architect must enclose his bill for the plans independent of superintendence, and also specify the price of superintendence, if employed for that purpose." The Commissioners, as we are subsequently informed, "reserve the right to reject any or all bids, and will only pay for such plans and specifications as are accepted." We should like to know how many architects propose to dance attendance at the session of the high Commissioners of Dakota, with their portfolios under their arms, on these liberal terms. Every one knows that no proposition, however mean and insulting, is regarded by the average public officer as too degrading to be offered to persons who are willing to work for nothing, but it is hardly conceivable that any architect with honest intentions should think of advertising his lack

of employment and low opinion of his own ability by noticing such an announcement.

FOLLOWING the example of the Florentine and Parisian colonies, the group of artists resident in Rome have prepared an earnest protest against the new protective tariff laid upon paintings and sculptures imported into this country, joining with it an appeal for its speedy removal. This action of the Roman residents is perhaps the more significant, inasmuch as Rome was the Mecca of American artists long before the *Salon* or the French school were heard of in this country, and the opinion of those who still cling to the Eternal City may be taken as that of the most conservative portion of our artistic society; but, as it seems, the devotees of high art are as sincere in their abhorrence of this kind of political patronizing as their impressionist brethren north of the Alps. We regret, however, to find them somewhat misinformed as to the direct support which the government of the United States has given to æsthetic culture. In their protest they say that "we, as a nation, have done nothing to foster art, have created no national museum," and so on. Evidently, the authors of this sentence have never visited Washington, where ample sums of public money have been spent in the acquisition, for the adornment of the Capitol, of what those who voted for the appropriations probably supposed to be works of art. One is rather at a loss, in contemplating these creations, to understand the theory on which the estimate of their merit was based, but it is not impossible, considering the sort of assertion which passes current among a certain class of statesmen, that the testimony of their authors on this point was received as convincing.

THE bill incorporating a company for the construction of a canal across Cape Cod in Massachusetts, was passed last week, after a bitter opposition, proceeding, it is said, from the railway companies. Several attempts have already been made toward the excavation of this canal; and, as the inhabitants of that region dryly remark, the route is strewn with empty champagne bottles left by the various parties of engineers; but the last company incorporated for the purpose made itself so ridiculous by the magniloquence of its promises, and the feebleness of its performance, that there has naturally been some hesitation in granting a new charter. As something like fifty thousand vessels pass now in a year around the extremity of Cape Cod, and the number is constantly increasing, the attention of those persons who take a satisfaction in the promotion of great engineering enterprises has been directed more earnestly than ever, since the failure of the last company, to an undertaking which seemed so certain of pecuniary success, and the associates who have advanced so far toward securing their charter are willing, as surety for their good faith, to deposit two hundred thousand dollars in the State Treasury, to be forfeited unless the scheme is carried through within a limited time. In explanation of the hostility of the railroads to the canal, it seems that while the others may be acting from a mere desire to obstruct any rival route for transportation, one, the Old Colony road, extends to the very end of the Cape, and would find its traffic seriously interrupted by a ship canal. Even with the best of drawbridges, the passage of a vessel across the line every six or seven minutes would lead to vexatious delays of trains, if nothing worse.

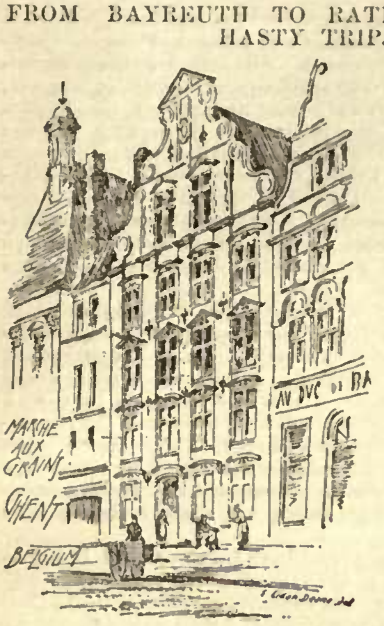
THE *Sanitary Engineer* appears this month in a somewhat different and improved form, giving, among other things, more importance to the excellent editorials which have always distinguished it. One of these articles in the first number for the month treats of the curious investigation now in progress in relation to the conduct of the Government Architect, and expresses the decided opinion that the public work should not "be interfered with, and the Departments demoralized, for the gratification of cranks and soreheads." In its opinion the investigation is, in part at least, carried on for the benefit, and at the expense, of disappointed contractors, who hope to gratify their resentment, if nothing else, by using a politician desirous of notoriety as a cat's-paw. This theory is certainly in some degree justified by the character of the evidence hitherto brought forward; and the animus of a few of the interested persons is illustrated by a letter from a manufacturer of elevators in Chicago, evidently written for publication, in which the Supervising Architect is accused of improper favoritism in refusing to invite this particular manufacturer to compete with others for furnishing elevators for the public buildings which have been erected under his care. We know nothing against the elevators made by the writer of the letter, but it is at least conceivable that the Supervising Architect may have refrained from asking him to compete because he did not approve of something in the design or construction of the machine; and it would be hard indeed if the officer responsible for our public buildings should be obliged to use anything in the shape of an elevator that might be offered him, if it only proved to be the cheapest in price.

A NOVEL case in real-estate law is reported from Indiana, where a vigorous widow, in running the boundaries of her property, found her calculations in disagreement with those of her next-door neighbors, who happened, technically, to be the trustees of a certain church. The discrepancy between the opposing estimates of lines or angles was so serious that by the lady's plan her boundary not only overran the church land, but came into collision with the church edifice itself. Being quite certain of the correctness of her own survey, and rightly judging that she was entitled to the occupancy of the whole of her estate, without regard to the encroachments which others might have unadvisedly made upon it, she proceeded to erect a fence upon the division line as she understood it, breaking all the church windows in order to obtain an accurate alignment. It happened, however, that the church trustees were equally convinced of the correctness of their plan, which represented their boundary as running on quite a different line, at some distance within the territory which the widow claimed as her own, and they too resolved to erect a fence on the boundary as they understood it. Unfortunately, the lady's convictions were stronger than theirs, or, at least, took a more active form, for no sooner had one of them appeared on the ground with his fence-building materials than he was assailed with a horse-whip wielded by the fair hands of the adverse claimant, and ignominiously beaten to the ground, together with his fence. At this point the aid of the law was invoked, to procure a cessation of hostilities while impartial justice should weigh in her balance the opposing claims; but no sooner was the sword of the blind goddess extended, in the shape of a policeman with a pistol, toward the scene of conflict, than the conquering heroine made a new charge, and after knocking the pistol from the policeman's hands, set two fierce dogs on him, who bit him in a most pitiable manner. After this, the hope of an amicable settlement seems, not without reason, to have been abandoned, and the machinery of the State courts has been set in motion to arbitrate between the belligerents.

IT seems that the project entertained in England for excavating a second canal across the Isthmus of Suez is likely to be forestalled by the managers of the present canal, who announce that they are on the point of constructing a duplicate of their own work. The territory already in their possession is large enough to admit of another canal parallel with the first, but they think it advisable, if possible, to obtain farther concessions of land from the Egyptian Government, and have already entered into negotiations for that purpose. It seems hardly likely that representations of this kind should have been made with no other purpose than that of breaking up the independent English scheme, and if M. de Lesseps and his associates should really intend to dig a second canal, they can probably do so to better advantage, and at less expense, than any one else.

ON the occasion of the Montgolfier celebration in France this summer an aëronautic exhibition is to be held in Paris, in the palace of the Trocadéro, to open on the fifth of June, and continue ten days. The exhibition is to comprise all kinds of materials used in the construction of balloons, such as cotton and silk fabrics, cords for nettings, bamboo for baskets, and so on; with balloons and parachutes, shown by models and drawings, as well as in the full size; scientific instruments for use in aërial voyages, including barometers, hygrometers and photographic apparatus; and apparatus for generating hydrogen and other light gases. In the last item of aëronautic practice, particularly, great improvements have recently been made, and persons interested in the subject will probably be able to learn much from the exhibition.

FROM BAYREUTH TO RATISBON. — NOTES OF A HASTY TRIP. — VII.



AS may be imagined from the description already given, the chief interest of Rothenburg for the architect, as for all others, lies in its general aspect. That is to say, while there are many fine or curious structures in the place they are equalled or surpassed by others of similar sorts in many other places; but in its general appearance Rothenburg is quite unique in the long list of German cities. Yet it is not to be supposed that we see here quite what we would have seen had Nuremberg, for example, come down to us in as unaltered a condition. Important though Rothenburg was in early days, standing though it did at one time next to Nuremberg in influence among the Franconian towns, it never was so large or so magnificent a city by many degrees. It acquired by force of arms or of money the dominion over numerous neighboring towns and villages and a wide stretch of fertile country. It ruled over some 20,000 souls, but even at the time of its greatest prosperity, toward the end of the fourteenth century, there were never more than 6,000 within its walls. Its burghers built on a sufficiently lavish and imposing scale, yet they did not realize the sumptuous beauty of Nuremberg, nor was Rothenburg ever, like Würzburg, the seat of powerful art-loving prelates, having been, indeed, a centre of Protestantism from the very first. It must have been, however, architecturally considered, one of the finest towns of the second class in Southern Germany, and this is enough to make us very grateful for its preservation in such peculiarly untouched condition down to our own time. As I have said, nowhere else save in the background of some old German print will the student of to-day gain so good an idea of how a fortified town looked in olden days as he can gain by looking at the west or valley side of Rothenburg. The back windows of our little hotel, *Zum Goldenen Hirsch*, looked right out over the western wall, and the view was one of the most exquisite as well as one of the most interesting I have ever seen, nature no less than man bringing elements of peculiar beauty to its composition. To right and left the wall with its toppling houses and turrets swept out in a wide curve; immediately below stretched the steep slope of the cliff planted with vines and gardens; at its foot, with the rolling hills beyond, was the rushing little stream spanned, toward the left, by the quaint old bridge, while the lovely church of Cobozell beside it formed a centre that could not have been more happily designed. No one should see Rothenburg in winter, for half its charm lies in its peculiar situation — which to the mediæval imagination always suggested that of Jerusalem — and in the beauty of the landscape by which it is encircled.

But when the wonderful general effect has been sufficiently studied and one's attention is turned to details there is still very much of the greatest interest to be found. Well within the present boundaries of the town many of the streets are spanned by gateways surmounted by massive towers. These mark the line of an early wall and were allowed to remain when the city had grown to such an extent that a new wall, the one still so largely preserved, was a necessity. This, which was also furnished with many gateways, has been partly removed toward the east and a portion of it was blown down by a storm some years ago; but perhaps three-fourths of its entire extent still stands, and the old moat still runs along a great part of its base. The towers are of the most manifold shapes, often surmounted with the quaintest curving roofs. It is usually impossible to say when the oldest portions of them may have been built, so oddly have they been patched and altered and restored at a dozen different times; but distinct relics of Romanesque work are often visible. This is the only place I have ever seen, by the way, where not only do the old city gateways stand, but some of the gates themselves still hang upon their hinges, though no longer closed at night. Romanesque relics of other sorts may be found by the diligent student, but most of the existing buildings date from late Gothic and from Renaissance days. It is due to the Bavarian vandals of whom I have already spoken that earlier remains are not more numerous. The chapel in the Burg is now in ruins but its interior is said to present interesting early Romanesque features. We were, however, unable to gain admittance.

In the streets which border and lead out from the beautiful market-place are many fine large dwelling-houses similar to the splendid Renaissance patrician homes of Nuremberg; but the rest of the town is chiefly made up of comparatively small and low dwellings, a story and a half or two stories in height. Many of them are undoubtedly very old though their simple construction does not lend itself to the fixing of dates. Some of them front the street, others stand with their gable end thereto. Most of them have been painted or color-washed at various times so that their heavy half-timbered construction is only now and then discernible beneath the coating; but fortunately actual white-washing has not been common. Usually a wash of a delicate tint — very pale pink or yellow or green or lavender — was chosen instead of white and is now weather-worn to a delightfully soft and mellow tone. It is not easy to imagine how fortunate an effect, pictorially considered, this sort of coloring, when subdued by time, can give to one of these old-time streets. Those of my readers who have been to Augsburg, where a similar fashion has been followed, will understand that this painting, though probably not given with any more definite artistic intention than that which inspires our own farmers when they use white and grass green, has yet been a very happy accident.

The market-place which occupies almost the centre of the town, is large and most imposing. Many beautiful houses front upon it and from it runs toward the west the wide Herrenstrasse containing others of equal importance; but the chief feature of the square is the Rath-Haus, which is admirably placed on rather steeply rising ground on the western side. A picturesque old Gothic building was partially removed to give place for alterations in the sixteenth century; but much of it still stands with a fine façade on the Herrenstrasse and a most picturesque tall tower. The newer portion facing the square is one of the finest civic structures which the Renaissance gave to Germany, — many stories with an octagonal staircase-turret rising through the whole elevation in the centre, and smaller turrets at either end. Along the front runs a splendid open portico built in the Italian *Rustica* style surmounted by a flat roof (forming a balcony to the second story) which is edged by a beautiful balustrade. The newer combines singularly well with the older Gothic portions, and together they make a group which for architectural as well as pictorial effect can not easily be over-praised.[1] Entering the newer portion by the central door we find a beautiful circular stairway, built round an open well. This, which occupies the turret already noted, takes us in the second story into a large vestibule, divided by columns only from a still larger hall. This is decorated by wall arcades with Tuscan pilasters and has a fine timber ceiling. Then through smaller apartments we reach the immense hall which forms a part of the older Gothic structure. Here was the scene of Tilly's famous wager with the burghers and of many another thrilling or picturesque incident in Rothenburg's history.

The Renaissance came late to Rothenburg, which had been greatly prostrated by the revenge taken by its conquerors for its sympathy with the peasants in their revolt. The impulse seems to have come from Nuremberg, since builders from this city are credited with most of the finer structures. A certain Wolff of Nuremberg built this Rath-Haus in 1572 and also the Gymnasium,—smaller but quite similar in style, also with a beautiful octagonal staircase-turret — and the group of hospital buildings at the southern end of the town.

One or two of the houses of this period are worthy to be compared with the best in Nuremberg, especially the one called *Geiselbrecht'sches* or the "House of the Mason" — perhaps of this same Wolff. It is entirely of stone with a high, stepped gable toward the street and with curious figures serving as consoles between the windows of the two principal stories. But the chief charm of these Rothenburg houses is in their interiors and court-yards — still quite unaltered though sometimes more or less decayed. The court-yards with their profusion of wood-carvings are most picturesque as well as most artistic. We only had time to glance into one or two, but the portfolio of every painter who has been to Rothenburg will reveal their attractions. And owing to the shortness of our visit we did not have time to give any more attention to the many interiors which are easily accessible to strangers. The houses are said to be peculiarly well arranged and their staircases are always a prominent feature. But we *did* take a moment to visit the beautiful room in the Haffner'sches Haus on the Herrenstrasse which is one of the chief sights of the town, though the building is occupied by a private citizen. It is entirely finished in wood and is in almost perfect preservation, only one panel being missing. Small Ionic pilasters, finely carved, support a false arcade around the walls and the intervals are filled with delicate inlaid ornamentation in different colored woods. The ceiling is later in date and is coarse and unattractive in comparison. It is a wonder the room has not long ago been stripped of its woodwork for the adornment of some connoisseur's dwelling. Perhaps the fact that Rothenburg, although known to artists, has never yet — as I have said — been visited by the wealthy tourist, may explain how this room has remained so long intact while so many less splendid examples of decoration have been carried from their homes. It would be vandalism to suggest the removal of any objects which form an integral part of a city's outward dress or of the decoration of any public building; but I may be pardoned, perhaps, for saying that one would hardly regret it if these lovely panellings should some day be secured for a transatlantic home or — what would be still better, and what they well deserve — for a transatlantic museum.

It is a suggestive fact that ecclesiastical buildings of the Renaissance period, while they are common in Catholic towns, are much more uncommon in places where the Reformation obtained an early hold. With the advent of the new doctrines the old churches were often, alas! purged of their popish ornaments and reduced to a dull

[1] In Volume IV of this journal will be found a large view of the Rath-Haus at Rothenburg from the pencil of Mr. Ipsen; and he has at other times, I think, contributed other sketches of the town, to which my readers are referred.

level of whitewash and nudity; but they were not altered and filled with work of an alien character, as they were when they remained in Catholic hands through the seventeenth and eighteenth centuries, and they seem to have answered all the needs of their owners for many a day. We can hardly say that the Protestant towns felt less interest in religion than their Catholic neighbors, but that interest did not seem to show itself in building. Here in Rothenburg we have an example. The great civic buildings date from Renaissance days but all the churches are anterior in time.

The oldest churches seem to have been the little *Burg Capelle* already referred to, and the "Chapel of the Holy Blood," containing a precious relic which made Rothenburg a favorite resort of pilgrims all through the Middle Ages. In the fourteenth century it was proposed to build a larger church on the site of this latter, and the result was the present St. Jacob's — the most prominent feature of the city. A curious story is told of how funds were collected for its erection. In 1336 it was ordained by the council that every citizen should contribute one *heller*— the smallest of possible coins—toward the building fund and that at every funeral a donation should be made. Small as these contributions individually were, by the year 1373 enough money had been collected to begin the work, which was not entirely completed, however, until the following century — the main portion in 1436 and the western choir in the latter part of the century. The church stands on a small square not far from the market-place, opposite it being the gymnasium. For a German church it is very high in proportion to its breadth; its towers are equal in size but not alike in design, and it has other peculiarities which make it even more individual. As is well known, German builders were always noted for adapting their design to the nature of their site and thinking no problem offered by the latter impossible of artistic solution. So we find that the builders of this church, when a street interfered with their work, did not close it up but calmly bridged it over, letting it run through in a sort of a tunnel underneath the western end of the building. From the outside the church with both its choirs appears as a whole, merely cut through by this tunnel; but inside we see that it makes a real division in the structure: the nave and the eastern choir compose the church, and one does not perceive that the organ in its loft at the west end is really standing on the top of the tunnel. There is no communication inside between the nave and the western apse, in the lower story of which last is situated the famous old Chapel of the Holy Blood — now used as a little museum wherein many curious and ancient pieces of sculpture are preserved.

The interior of the church is very interesting to the architect, though it has not a particle of *pictorial* charm to-day, since it has been carefully whitewashed and furnished with some very hideous modern glass windows; but it contains some beautiful carved wooden altars of early date. The Franciscan Church on the Herrenstrasse is older — the nave having been built toward the end of the thirteenth century and the choir about 1360. It is an interesting three-aisled structure without transepts. The nave has a flat ceiling, the choir a vault supported by brackets, the pillars being without capitals. Curious points about the building are that the choir is so enclosed by chapels as to be almost shut off from the nave — a device to secure privacy for the brothers when at service — and that the small clerestory windows of the main portion are square-headed.

The hospital buildings at the southern end of the town offer many interesting features — none more charming than a quaint little one-storied square structure in the centre of the great court-yard, with a high tent-like roof, which has probably been painted many dozens of times by the wandering fraternity of artists. Here indeed, is the quarter of the town where the artists most do congregate; for near the hospital is the old *Spital Thor* or "Hospital Gate," one of the most picturesque in the town, though one of the latest, having been built in the sixteenth century. Near it we see a long stretch of the inside of the city wall, with a curious covered gallery for promenaders, and a most picturesque group of battered old dwellings. Through it from the outside one gets a wonderful glimpse of the town, while as we pass beneath it and look outward we see two roads, one running out along the edge of the flat table-land, the other winding steeply down into the valley, with the bridge and the little Gothic church of Cobozell as its termination. So it is not wonderful that the easels upon which one comes at almost every corner in Rothenburg should in this vicinity be especially numerous.

But it is impossible to name all the buildings in Rothenburg that have points of interest, or to suggest the riches of the country round about for those who care to look for good things in quiet corners. We had no time to do more than survey the immediate environs of the town. The Cobozell church is extremely lovely, though very simple, without any spire save the delicate little appendage which the Germans call a *Dachreiter* on its western gable; with very good tracery in the windows; and, we were told, with a particularly beautiful circular staircase inside. But this last we were unable to see, since after many efforts and much scouring of the neighborhood, we were foiled in our attempt to find a certain old woman who keeps the key and is supposed to sit in the weed-grown church-yard and wait for visitors.

A mile or so northwest of Rothenburg down a beautiful sloping road takes one to the tiny village of Detwang — if that can be called a village which is no more than two or three houses and a mite of an old church. Yet this was once the mother church of Rothenburg — an older foundation than any within the town itself. The American artist to whom I have already referred told me that a few years ago the little structure was still intact and was one of the most picturesque bits that could be imagined. Since then it has been furbished up and whitewashed, but its architectural interest is still great, for it is Romanesque of a very early time and, though simple, of a very charming sort. Indeed, nothing is more charming in any age than one of these early German Romanesque double windows with its mid-wall shaft, never seen, I think, in Norman work, though present in the Saxon relics of England. One such tiny double window is enough to give grace and beauty to a façade of such small dimensions as this at Detwang. Inside the church is an elaborate wooden altar of late Gothic date — if not carved by Riemenschneider then by some one who was his equal.

I must not forget to give a word to the many fountains of Rothenburg, especially the large one near the Rath-Haus, with its delicate strap-work Renaissance decoration; nor to the iron-work which is as profuse as it is beautiful. Among the most splendid specimens of the blacksmith's art I ever remember to have seen were two window-screens in the ground-floor of a house on the *Herrenstrasse*, nearly opposite the Franciscan Church. They were the great bowed things giving place for a window-seat within them outside the sill, which are common in the eighteenth century, and were a marvellous example of the most florid yet most graceful and artistic *Rococo* style.

Fifteen years ago Rothenburg must have been very rich in bric-à-brac and it may seem strange to hear that it is not easy to find any there to-day. Probably the artists captured at infinitesimal prices all that was visible on their first advent, and they were followed by dealers from other places who had heard the tales they told. The place is still too unsophisticated for the establishment of bric-à-brac shops and the manufacture or importation of their contents. I do not doubt that many good things—especially in the way of old pewter, in which the town was once peculiarly rich — may still be obtained if one has the time to rummage among the closets of private citizens; but the only place we could hit upon that seemed likely to yield us anything was a very small, very crowded, and very dirty pawn-broker's shop; its contents were chiefly the cast-off clothes of the Rothenburg population, but we did succeed in getting some odd bits of silver and pottery.

I have passed the limits of editorial toleration, I fear, in my rambling account of Rothenburg, yet I feel as though I had but just begun to speak about it. I may only add that looking back upon a peculiarly well-spent life — well-spent, that is, as regards my own pleasure— I find many a red-letter day to rejoice over in retrospect; but among them all there is not one, perhaps, which rivals the August day I spent in Rothenburg — going thither half reluctantly, lest after all I had heard I should be grievously disappointed, but coming away with the feeling that for once reality was as good as imagination — feeling, indeed, that the half had not been told me.

M. G. van Rensselaer.

PREVENTION OF FIRES.[1] — I.

FROM A HOUSE IN RUE PAVÉE-MARAIS. PARIS. CLOSE of the XVI CENTURY

THE following report of the Committee of the Society of Arts was lately discussed: —

The information already available to the public on the subject of fires in theatres is so extensive that the Committee find themselves able to add very little to it. The subject was inquired into by a Select Committee in 1866, and again in 1876 and 1877. On both occasions a large amount of evidence was taken, and the information regarding the condition of the London theatres at that date is as full as need be desired. Much available information is also contained in the Annual Reports of Captain Shaw, the chief officer of the Metropolitan Fire Brigade, to the Metropolitan Board of Works, and also in a pamphlet published by the same gentleman on "The Prevention of Fires in Theatres." Captain Shaw has also recently made special reports to the Metropolitan Board of Works, on the condition of all the London theatres. These reports, except that on the Gaiety Theatre, which has been printed by Mr. Hollingshead, have not been published; but the Committee are

[1] From the Journal of the *Society of Arts*.

given to understand that they are of a very full and exhaustive nature. The committee cannot but think that the public circulation of the information they contain would be attended by beneficial results, even though some of it should place particular theatres in an unfavorable light. If it be a fact that any theatre is in a dangerous state, the public ought to be informed. Supposing any serious accident to occur in such a house, there can be no doubt that a very grave responsibility would fall on the shoulders of those who have kept back the knowledge which might have saved valuable lives.

The Society has itself dealt with the question, so far as water-supply is concerned. In 1875, a committee reported on the means of protecting the metropolis from conflagrations, and in 1877, a second report was issued by the same committee, on fires in theatres. At the present time, the Committee acting upon the information at their disposal, have thought it well to prepare a series of suggestions, which may be taken as representing the opinions of those best qualified to judge, as to the points which should be attended to in the construction and management of a theatre, with reference to the protection of the public from loss of life by fire, or from the even more serious loss of life which would certainly occur from panic caused by the breaking out of a fire, however small its extent.

How these suggestions should be put into actual practice is a point with which the Committee have not dealt. The question of the licensing, inspection, and general regulation of the theatres, not only in London, but in the provinces, is so large a one that they have considered it wiser for them to keep to one special portion of the subject. It may be sufficient to note that the theatres within the metropolitan boroughs, and defined in the Act of 1832, are, with the exception of the two old patent theatres, Drury Lane and Covent Garden, under the jurisdiction of the Lord Chamberlain. These theatres are annually licensed by him, and the license can be revoked in extreme cases, but there is no power to suspend a license for a time, or to inflict any penalties less than the suspension of the license. The Lord Chamberlain issues regulations for the management of the theatres, and once a year an inspection is made. It is believed that these regulations are fairly well attended to, at all events when the period for inspection approaches, but whether they are attended to or not seems to depend principally upon the good feeling of the managers of the theatres. Theatres, in common with all places of public entertainment, come under special provisions in the Metropolitan Buildings Act. These provisions require that the floors and passages, stairs, etc., should be of fire-proof material, and carried by fire-proof supports; also that the whole of the building should be constructed in such a manner as may be approved by the district Surveyor, or, in case of disagreement, by the Board. It is under this act that the Board directed the recent inspection of theatres by Captain Shaw.

The Committee are much indebted to the Secretary of State for Foreign Affairs, who has been good enough to procure for their use copies of the regulations in force in Belgium, in Berlin, and in Vienna. Summaries of these regulations will be published hereafter as appendices to the report. Another appendix contains an account of the researches which have been made, with a view of discovering some material which might be applied to fabrics and to combustible materials, generally with a view of preventing them from taking fire. For the account of these researches they are indebted to one of their number, Sir Frederick Abel. The points which, in the opinion of the Committee, should be attended to in the construction, etc., of theatres, may be classified as follows: —

a. Structural (including arrangements for heating, and with special reference to exits).

b. Arrangement and treatment of scenery and accessories.

c. Arrangement of illuminating appliances and stage effects involving the use of gas, pyrotechnic compositions, etc.

d. Regulation, organization of fire-brigades, etc.

(*a*). *Structural.* — These are certainly the most important of all. First, the building itself should be constructed in a manner calculated to check the spread of a fire. To this end it should be divided as much as possible by fire-proof partitions, and above all there should be a division between the stage and the auditorium, extending from the base to the roof. The opening from the stage in this partition should be defended by a metal screen, or a fire-proof curtain of some sort, though it appears from the experience of the fire at the Berlin National Theatre that the iron curtain actually tore down part of the wall, so that this means of protection has its objectionable features. Perhaps the curtain devised by Captain Shaw, which can, in a very few minutes, be saturated with water, would be effective to this end. There should be an ample water-supply, either by reservoirs at sufficient height, or by connection with the street-supply — the latter for preference. Hydrants and other proper fittings should be provided in abundance. The Committee have had a favorable account of the action, in some warehouses in America, of an arrangement for deluging any part of a building by a shower of water from fixed perforated pipes. They, however, have no information as to whether this arrangement has been used for theatres, and can offer no opinion from their own knowledge upon its merits. Means should be provided for carrying off smoke and heated air, in case of a fire breaking out on the stage or amongst the scenery, so that they may pass away, instead of being, as would now nearly always be the case, drawn into the body of the theatre by draughts usually existing. It is desirable that a theatre should be, as far as possible, separated from adjoining buildings, especially from buildings in which any trade or business is carried on likely to lead to fires. The same provision is also of importance with regard to exits, it being of the greatest consequence that a theatre should discharge its audience into more than one street, even, if possible, into more than two. The different parts of the theatre should have different exits leading right out to the street, exits bringing streams of persons together being specially dangerous. Such exits should increase in width outwards, and should be free from interruption or impediment of any character. Steps in passages, either ascending or descending, should be avoided, and other obstructions likely to cause people to fall. All doors should open outwards. Staircases should be properly fitted on both sides with hand-rails. As regards heating, it does not appear that special arrangements are generally adopted for heating theatres, except by means of ordinary fire-grates in refreshment-rooms, lobbies, etc. Should the electric-light come into general use for lighting theatres, it is possible that they will require to be specially warmed, in which case the usual precautions will have to be employed.

(*b.*) *Arrangement and Treatment of Scenery and Accessories.*— As regards the scenery and the lighter sort of costumes, there seems to be no doubt that measures ought to be taken to render these uninflammable, or at all events, not easily inflammable. For fabrics the best material seems to be tungstate of soda, and this has been successfully employed in some theatres. Mr. Henderson, at that time the proprietor of the Criterion Theatre, giving evidence before the House of Commons Committee of 1877, said that he used it, and that there was no difficulty in its use as regards new scenery; to old scenery, he said, it could not be applied. There appears to be no reason why the woodwork of scenery should not be treated with silicate of soda, either with or without a lime-wash, after the method described in the appendix.

The Committee are not aware whether this actual process has been applied; they would be glad to know that experiments in this direction had been made, but they are informed that the scenery of some London theatres is now treated with some of the more recently invented preparations, most of which, it is understood, have a silicate or a borate for their basis. The effect of all such preparations is that it coats the articles, or, in case of fabrics, the fibres of the articles, with a non-inflammable substance. This does not prevent the evolution of gas from the material when sufficient heat is applied, and the gas thus evolved takes fire and burns. When the source of external heat is removed no more gas is evolved, and combustion ceases. Thus it may be said that the article will burn when exposed to sufficient heat, but has not, in itself, the power of supporting combustion. One effect of this is that it is very much more difficult to set such materials on fire, and this alone is sufficient either to prevent the breaking out of fire at all, or to render it much easier to deal with after it has broken out.

(*c.*) *Arrangement of Illuminating Appliances, and of Stage Effects involving the use of Gas, Pyrotechnic Compositions, etc.*— There is not much to be said about the ordinary lighting arrangements. In all theatres they are generally under the control of a special gas-man. It is desirable that precautions should be taken for the ventilation of places in which the meters are fixed, generally underground cellars, to avoid the risks of explosions.

When electrical illumination is employed, the necessary precautions should of course be taken; in fact, the rules laid down by the Society of Telegraph Engineers apply equally well to theatres as to other buildings. Whatever system of illumination may be employed, whether gas or electricity, it is absolutely necessary that oil or candle lamps should be fixed up in the passages, and near the doors, so that, in the case of the failure of the ordinary lighting arrangements, the audience may not be left in the dark. This is now done in many theatres, and ought to be done in all. Curiously enough, it has happened that these lamps have proved a source of danger, as a theatre in Hungary is reported to have been burnt by one of these "alternative" lamps.

The lighting arrangements for the stage are often very dangerous. The rules which now exist as to the use of naked lights upon the stage ought to be strictly adhered to. All lights should be, and in many theatres are, carefully protected; the footlights should have a grate before them; the wooden battens over the stage, carrying rows of gas-lights, should never be allowed.

Small accidents have, it is understood, not unfrequently occurred from the careless use of the oxy-hydrogen light. This light, when carefully employed, is perfectly safe, but in the hands of careless or inexperienced persons it is liable to give rise to explosions of a dangerous character. The causes of many of the explosions which have occurred, not only in theatres, but during other exhibitions where the light has been used, have not always been traced, but probably in many cases they are due to the gases having become mixed in one of the bags. A bag in which a little hydrogen remained may have been, by mistake, filled with oxygen, and thus a mixed gas of a very explosive character produced. Another source of these explosions is sudden alteration of pressure upon the bags, by which the mixed gases are drawn back into one of the bags, when a similar result occurs. It would be well if the very simple device were employed of storing the gases, when the ordinary coal-gas mains are not employed, or the oxygen gas when they are, in proper gas-holders outside the walls of the theatre, and laying the gas or gases on in the same way as ordinary illuminating gas is laid on.

The use of pyrotechnic compositions is a common source of danger, and it is believed that many of the most serious fires are due to them. Portions of the material are left about after the conclusion of the performance, become ignited, and the result is a fire. Some of these

compositions have, moreover, been proved to be capable of spontaneous ignition. Wherever these materials are used — and it would probably be useless to attempt to stop their use—the greatest precautions ought to be taken. In some places burning houses have been introduced on the stage. This is certainly a most dangerous practice, and might well be forbidden.

(*d.*) *Regulations, Organization, etc.*— There appears to be a good deal of doubt whether it is best to leave the arrangement for the detection and extinction of fire in the hands of the regular employés of the theatre, or to have special firemen for the purpose. The report of the 1877 Committee was in favor of the former system, but the latter seems to be coming generally into use. At most of the chief theatres of London, one or more trained firemen, generally old members of the fire-brigade, are employed. Mr. Ponsonby Fane quoted a remark to the effect that the best prevention of a fire in a theatre was the carpenter's cap, because, directly the carpenter saw a fire beginning he took his cap off and knocked it out.

All the employés ought to be trained how to act in case of fire, inasmuch as on their presence of mind must obviously depend the safety of the audience. They are familiar with the locality, and they are of course accustomed to dealing with crowds of people. Strict regulations ought to be enforced, with the view of preventing the common practice of filling up gangways with chairs, which in the case of panic, would form really serious obstacles to the escaping crowd.

How the regulations for the safety of theatres should be enforced is a question with which, as stated at the commencement of the report, the Committee do not propose to deal; nor are they prepared to offer any opinion as to the amount of inspection which would be desirable, or as to how far managers should be made responsible, and the carrying out of the regulations left to them. It appears to be the general opinion amongst those best qualified to judge that the strict regulations—for instance, in the French theatres—are by no means productive of good. Mr. Hollingshead, in his evidence before the 1877 Committee spoke rather strongly on this point, and gave evidence to show the bad working of the rules. According to him, the responsibility was so much divided between the director of the theatre and the *sappeurs-pompiers*, that there was even more liability to fire than in English theatres. He gave an instance of interference in the arrangements of a piece he had sold to the Porte St. Martin, in which the police would not allow the scenery to be set up or lighted properly, and the result was that the whole tumbled down, and caused a panic amongst the audience, by scattering an enormous number of splinters of glass about. At all events, it is a remarkable fact, somewhat bearing upon this portion of the report, that according to a statement in the 1877 Report, not a single life had been lost by fire amongst theatrical audiences for fifty years preceding, and the same statement might, it is believed, be made at the present time. Many, however, have been lost by panics in theatres during the same period, and this certainly goes to show that precautions against panics should be even more carefully taken than precautions against actual fire.

In concluding the report, the Committee wish to draw attention to a proposal recently brought before the Society by Mr. Cornelius Walford in his paper read on the 28th of February, last, upon "Loss of Life and Property by Fire" — the proposal that an inquest should be held in cases of house burning when there had been no loss of life. The suggestion appears to have been first made in the year 1845, by Mr. Sergeant Payne, then coroner for London and Southwark. It has since been brought forward by his son, Mr. W. J. Payne, the present coroner for Southwark; and the letter which Mr. Payne, in 1873, addressed to the *Times* on this subject was reprinted in the *Journal* which contained Mr. Walford's paper. For a short time the plan was actually put in execution by Sergeant Payne, who, on receiving information that a house had been burnt, granted a warrant for a jury and witnesses in the same way as in the case of an inquest when death occurs; but the system was put an end to by a decision of the Court of Queen's Bench. Such inquiries might be made either by the coroner, or by a special officer appointed for the purpose, and, if necessary, they might be only made in cases when the Chief Officer of the Fire Brigade reported that the case was one that required investigation. The Committee, however, content themselves with drawing attention to the question, without suggesting a scheme by which it might be carried into effect, and they would only remark that a precedent for such inquiries is found in the case of collisions at sea, and in railway accidents, since in both cases inquiries are carried on by the Board of Trade, even though there may have been no actual loss of life.

THE ILLUSTRATIONS.

SEABRIGHT STORES, SEABRIGHT, N. J. MR. H. EDWARDS-FICKEN, ARCHITECT, NEW YORK.

THIS block comprises eight stores on the ground-floor, with a small sleeping room in the rear of each store, and seventeen rooms over, which are used in connection with the Seabright Inn across the way. The stores average sixteen feet by fourteen feet, and are rented as branch establishments of New York business houses catering to the summer residents of the place. The local post-office is in one of the corner stores. The rooms in the rear of the stores have each a sink and provision for a stove. The rooms over are rented in suites, with a private hall to each suite. Housemaid's sinks are provided outside on the gallery at each end of the building, enclosed with lattice-work screens. Second story outside is shingled. Electric bell communication to the Inn opposite renders service between the buildings very easy.

PARTS OF A COUNTRY HOUSE. MR. OLIVER C. SMITH, ARCHITECT, ALLEGHENY, PA.

STABLE FOR A. T. ATHERTON, ESQ., LOWELL, MASS. MESSRS. MERRILL & CUTLER, ARCHITECTS, LOWELL, MASS.

BENEDIKTINER ABTEIKIRCHE ZU LAACH. MEASURED AND DRAWN BY MR. FRANK ZIMMERMANN, NEW YORK, N. Y.

OF this Henry II is considered the founder; he, with the permission and sanction of the archbishop Engelbert of Trier, in the year 1093, laid the corner-stone. After many interruptions caused by wars and the death of several protectors of the church, it was finally dedicated in the year 1156, by the archbishop Hillin of Trier. The church has a double choir, one to the west, the other to the east. The rich architectural work of these steeples is said to date back to the middle of the twelfth century. Since the early part of the nineteenth century the church has been in a state of decay.

SKILES & LINDLEY BLOCK, MINNEAPOLIS, MINN. MESSRS. WILSON & KIMBALL, ARCHITECTS, MINNEAPOLIS, MINN.

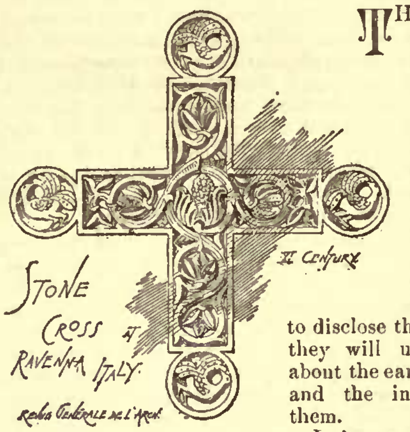
THIS building fronts on Nicollet Avenue, 100′ x 165′, on the corner of Seventh Street. There are eight stores and seventy-five offices. Access is had to the several floors by elevator and two stairways. Material used is brick with terra-cotta courses, and a large *cove* terra-cotta cornice.

THE MECHANIC'S HOUSE COMPETITION.

THE jury has awarded the three equal prizes of fifty dollars each to the authors of the following designs:

"*Minimum*" (Mr. J. S. Trowbridge.)
"*Sweete Simplicite*" (Mr. A. C. Schweinfurth, Boston, Mass.)
"*Broome Street*" (Mr. W. B. Mowbray, New York, N. Y.)

UXMAL.



THE name of Yucatan calls up mental pictures of ruined cities once the home of a lost race, but now the habitation of beasts of prey, birds of gorgeous plumage, and strange reptiles. Perhaps no part of the continent is more interesting to the archæologist, for if these temples and palaces which are buried under the jungle, can be forced to disclose the secrets of their history, they will undoubtedly tell us much about the early civilizations of America and the invasions which destroyed them.

It is now forty years since attention was called to these ruins by Mr. Stevens; but although the importance of his discoveries was recognized by the scientific world, the peculiar difficulties in the way have so hindered the work of exploration that comparatively little has been done. The country is remote, the climate very unhealthy, the natives lazy and suspicious, and the jungle filled with dangers. Hence few have had the opportunity, courage, and patience to continue the work so well begun by Mr. Stevens.

Within the past three years, however, much has been done by Mr. Louis H. Ayme, the United States Consul at Merida, to increase our knowledge of this curious subject. Mr. Ayme is a trained observer, and has thrown himself into the work with great zeal. He has visited most, if not all, of the sixty-three buried cities which have been discovered, and has studied the principal ruins with great care. What is covered by this simple statement, few persons, sitting comfortably at breakfast, can imagine. The ruins are reached only by a ride of eighty miles through the jungle, and when the visitor arrives at the end of his pilgrimage he must know how and where to look or he will not find a trace of a habitation. The site once determined, the rank vegetation which hides it must be cut away, stones scraped and overturned, secret passages explored, images and inscriptions scrutinized, photographs and drawings made, and all under the rays of a tropical sun in jungles which exhale fevers and hide dangers of many kinds.

Mr. Ayme has returned to the United States for the purpose of reporting his discoveries to the scientific societies with which he is in correspondence, and to obtain their help in further prosecution of the work. He ascribes to the ruins of Uxmal and elsewhere an antiquity of not less than a thousand years, though he does not subscribe to the very great antiquity claimed for them by Dr. Le Plongeon. On the contrary, he discredits this theory, while giving his fellow explorer praise for his great learning and enthusiasm. The notion that these ruins date back to some remote epoch has a touch of romance which appeals to the popular fancy, and their appearance does much to make such a theory plausible; but in Yucatan carved stone crumbles rapidly, and within the memory of old people among the natives the ruins have perceptibly changed in appearance. Moreover, it is

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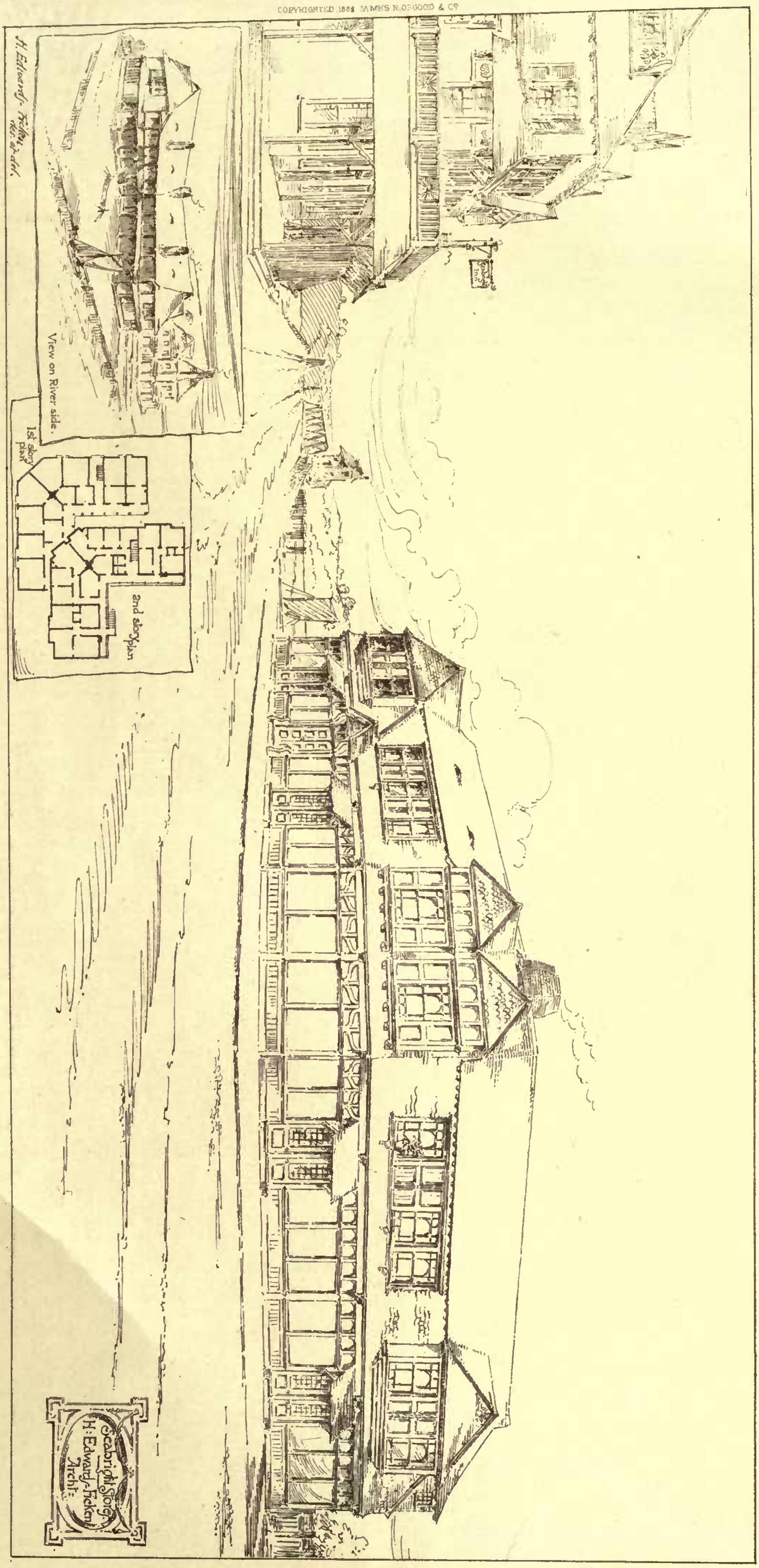

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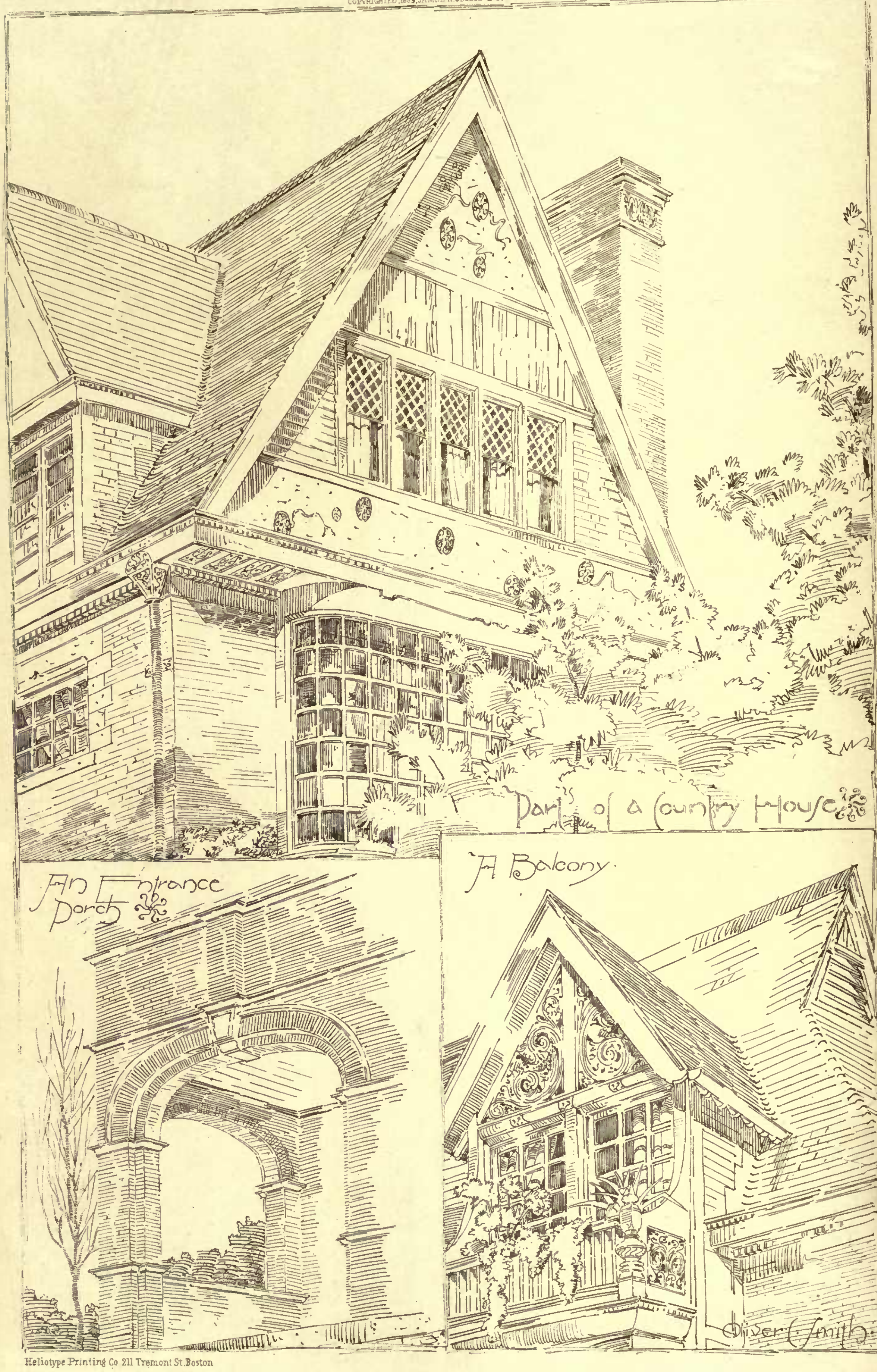

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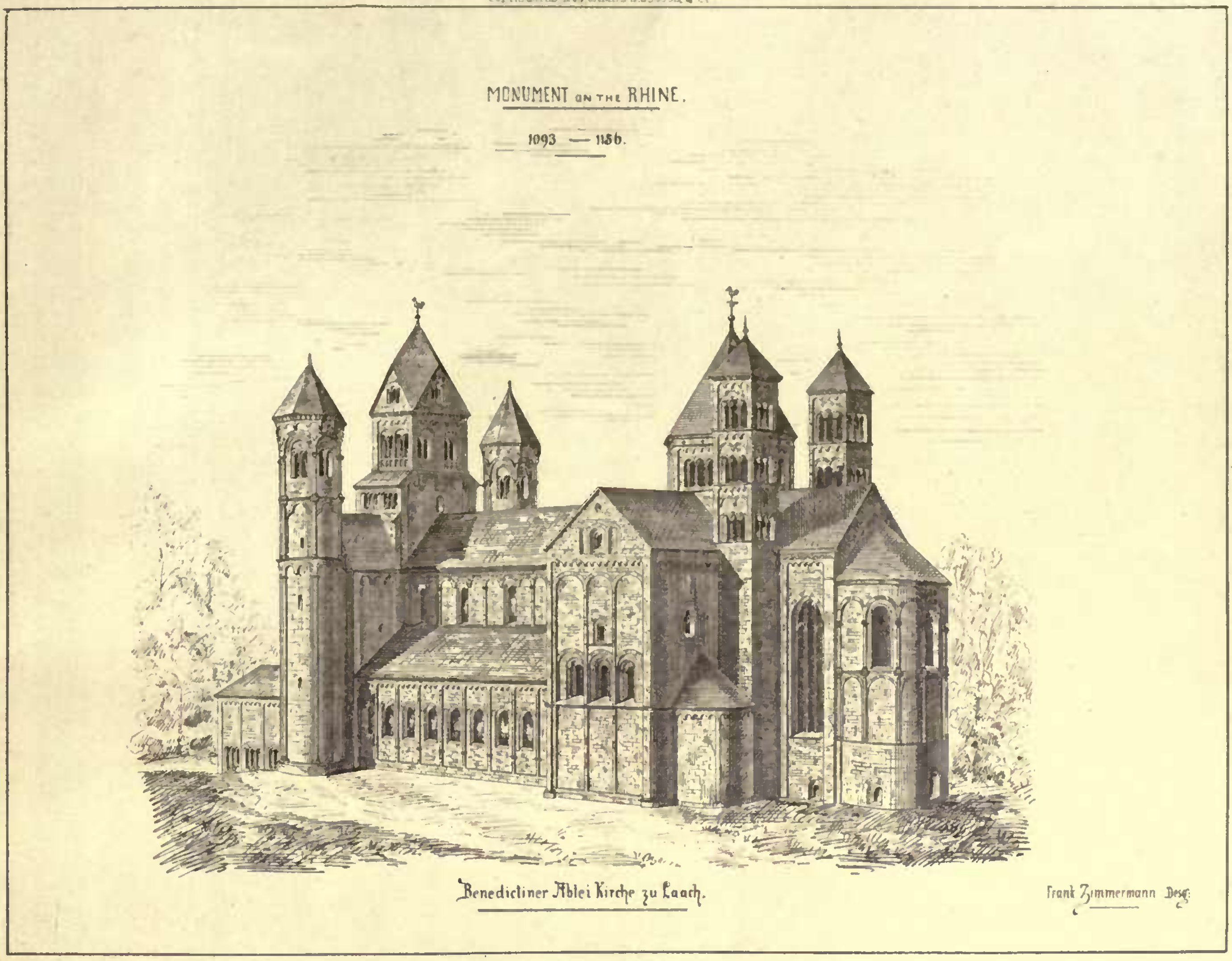

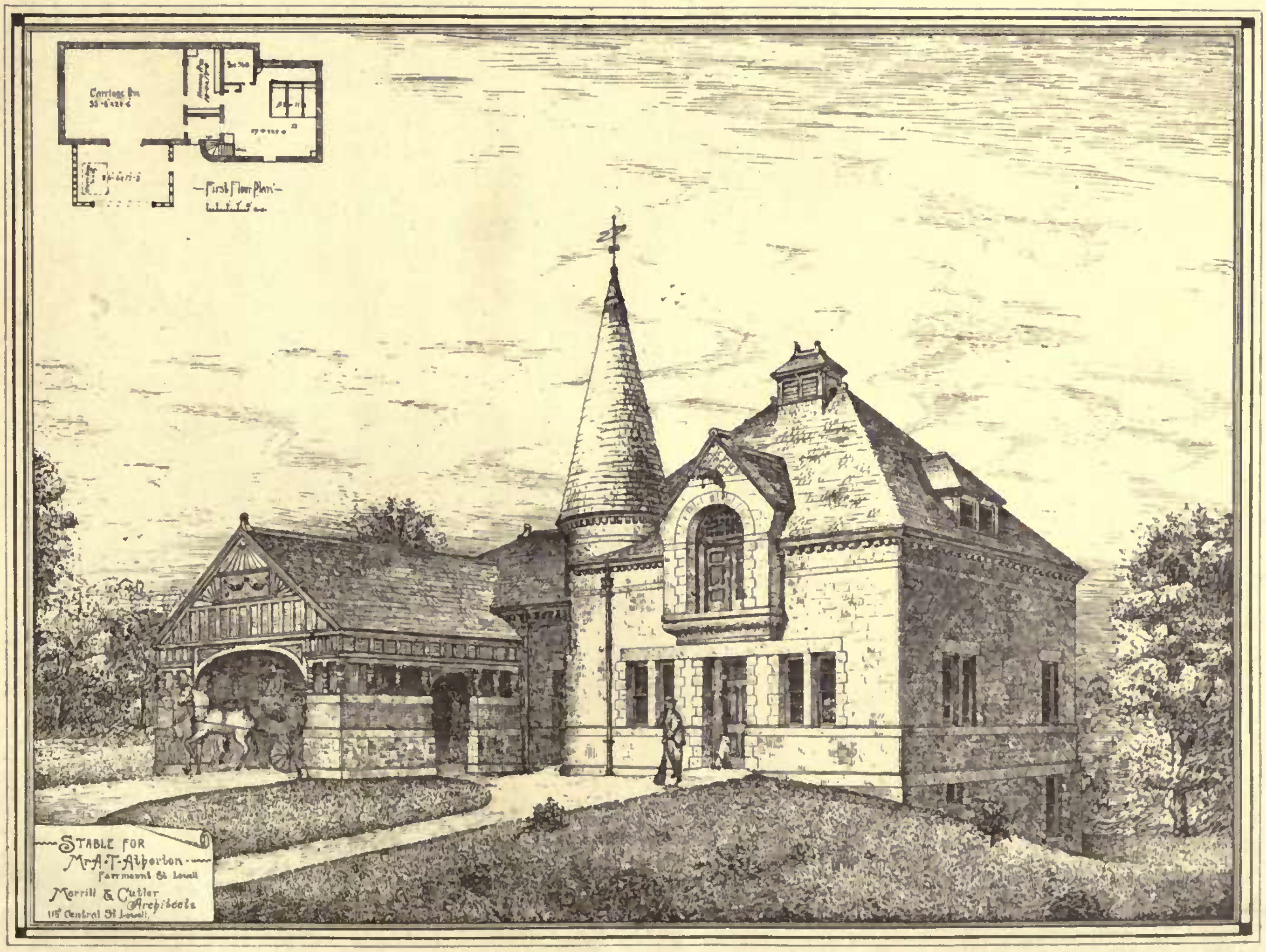

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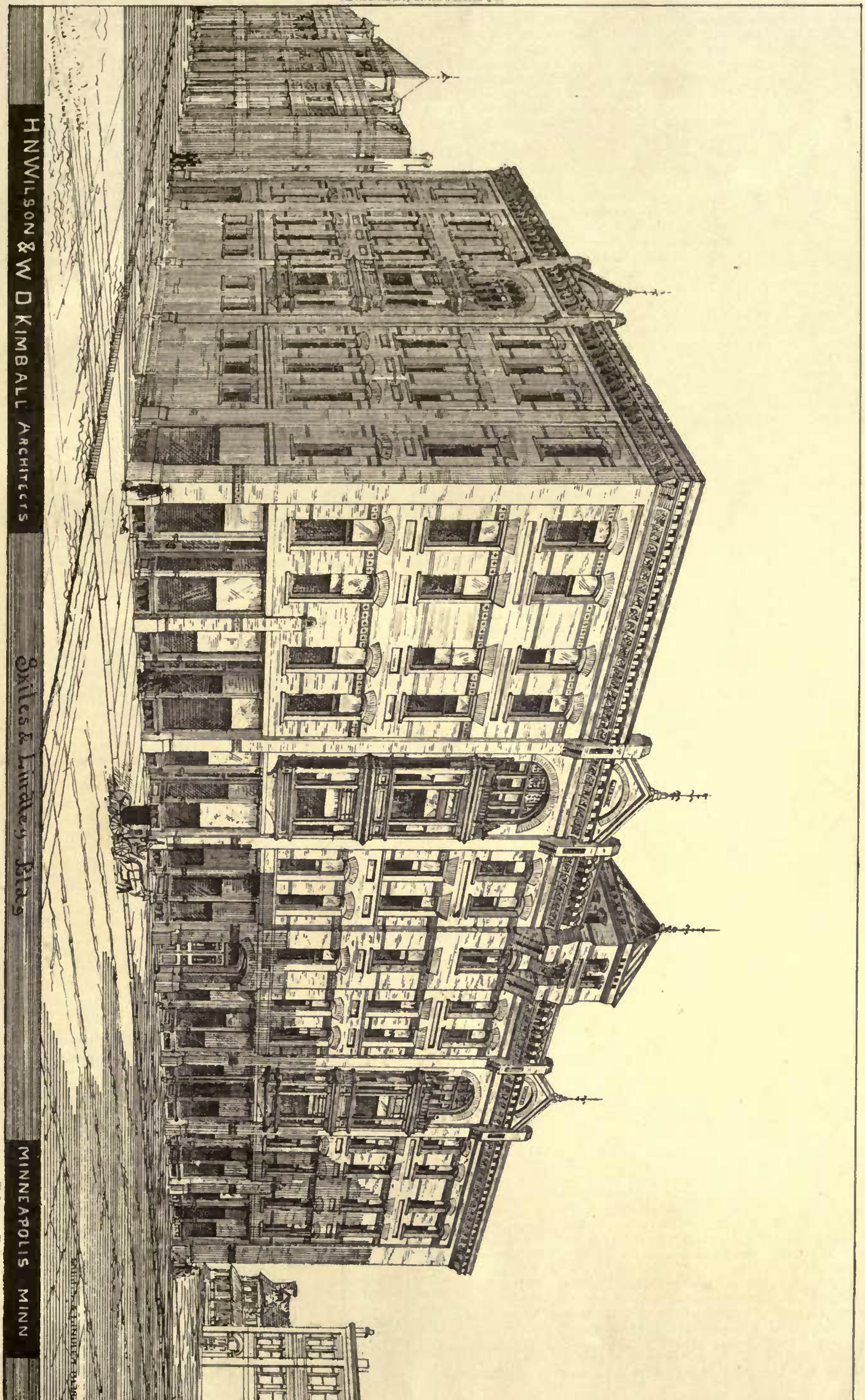


Heliotype Printing Co. 211 Tremont St. Boston.

evident that these cities were several times built over. In fact, the name of "Uxmal" means "three times built." Mr. Ayme believes that the houses were used when the Spaniards came, and in support of this theory, he has found a curious drawing on the wall of a building in Uxmal, which seems to be an effort at the representation of a Spaniard on horseback, as if some native artist had seen the strange visitant on the seaboard and hurried into the interior, where he depicted the foreigner for the information of his countrymen. The meaning of the picture, however, has not been fully settled, nor has their system of hieroglyphics been resolved, and until this is done our knowledge of the people must rest on circumstantial evidence.

It is a curious fact that hitherto no utensils of the aborigines of Yucatan, with very few exceptions, have come to light. A little pottery has been found and some obsidian arrow-heads, worked shells, clay images, and so on, but nothing of importance. Mr. Ayme thinks, however, that he has discovered the location of their cemeteries, or of one at least, and his explorations in future will be directed to ascertaining if his theory in this respect is correct. — *New York Sun.*

WATER-CLOSETS.[1] — XIII.

THIS form of bowl is used by A. G. Myers, of New York, on his pan-closets. In 1876, Harrison, of Philadelphia, received patents on the combination of a closet-bowl and a drip or slop tray in one piece of earthenware. The bowls last mentioned have forms convenient and useful for the purposes they are intended to fulfil. Harrison's bowl, having the smallest surface exposed to fæcal matter dropping upon it, should be preferred.

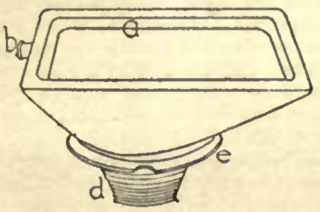


Fig. 126. — Square French Bowl.

a, Flushing-rim. *b*, Supply. *e*, Rim to set on receiver. *d*, Portion that dips into pan.

Among other closets of this class, I will mention Jones's "Empire" closet, Harrison's "Eureka" and "Ne Plus Ultra" closets, Craigie's "Century" closet, which differ from the ones already described only in the form and position of the weighted lever or supply-valve. The "Cistern" pan-closet, as its name implies, is arranged without a supply-valve, being flushed by water from a tank or cistern.

In addition to the nuisance created by the accumulation of filth in the container, the supply-valves, as they are usually made and attached to pan-closets, will generally be found out of order and in a leaking condition, and the joint between the bowl and container is rarely in a perfect state.

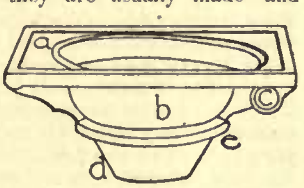


Fig. 127. — Harrison's Bowl.

a, Drip-tray. *b*, Bowl. *c*, Supply. *e*, Rim to rest on top of container. *d*, Part to form water-seal in pan.

A container with a vent-pipe and flushing arrangements, and made of earthenware or enamelled iron; a bowl with a flushing-rim and at least an inch-and-a-quarter inlet for the supply-pipe, and the water-supply taken from a small tank or cistern placed directly over the closet, should be obtained, if at any time it be absolutely necessary to select a closet of this class. When the improvements above enumerated have been applied to a pan-closet, it loses its only hold on the people — cheapness.

PLUNGER-CLOSETS.

There is evidence that closets which properly belong to this class were in use both in France and England more than one hundred years ago (See *American Architect*, December 23, 1882, Figures 14–20); in fact, this appears to be the only form or class of modern closet which it can be positively asserted was in use at this early date.

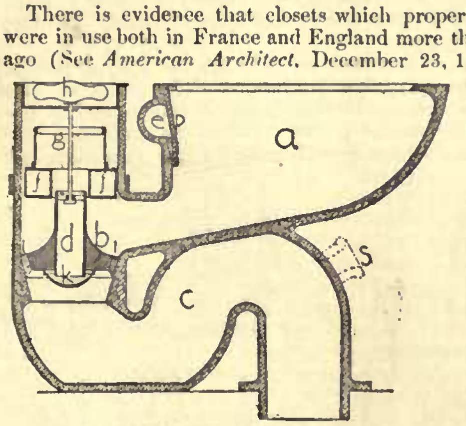


Fig. 128. — Section.

Jennings & Lovegroove's Plunger-Closet.

a, Bowl. *b*, Plunger or plug. *c*, Trap. *d*, Overflow through plunger. *e*, Supply-orifice. *f*, Float for governing the supply-valve. *g*, Lever connecting float with supply-valve. *h*, Hand-pull. *i*, India-rubber band around plunger. *k*, Saucer-trap to the overflow. *l*, Support for supply-valve. *m*, Cross-bar in plunger. *p*, Fan. *s*, Dotted lines show where vent-pipe is formed on Jennings's closets at the present time. *o*, Supply-valve.

It is a strange fact that, while such a large number of patents were issued for improvements or variations on valve and pan closets, not a single attempt was made to improve on the plunger-closets, as no patent was granted until the year 1857, when a patent was issued by the United States for a tank connected with a solid plunger-closet, invented by Henry & Campbells. Under this class properly come all closets that have a plug instead of a valve or pan, to break the connection between the soil-pipe or trap and the bowl. The plug may be solid or hollow, and have its seat over the trap or the soil-pipe, or over an offset from the soil-pipe. The plug is raised and lowered into position by a short rod, which is attached directly to the plug, and at the top of which is the knob or handle for the hand. The bowl is usually kept about half full of water by the plunger. An overflow is provided through the plunger, when it is hollow, and through a separate pipe usually having a water-seal, when it is solid.

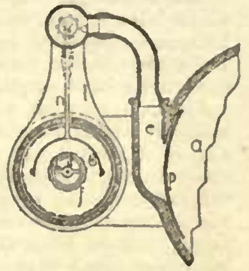


Fig. 129. — Section.

Showing Plunger-compartment and Supply.

Jennings & Lovegroove's Plunger-Closet. — The first letters-patent for a closet of this class issued by Great Britain were issued to George Jennings & Lovegroove, in the year 1858. This might, with propriety, be named as the first invention in the class, containing as it does a novelty in the hollow plunger; the solid plunger being old. Since the date mentioned, Jennings has received a number of patents for alterations in the form and position of the different portions of his closet, which he considers improvements on his first invention. Jennings appears at first to have received the unqualified support of, and recommendations from sanitary engineers and architects; but those who praised his closet most highly have seen reason to withdraw or at least qualify their recommendations. The chamber which contains the float for closing the supply-valve, and also the chamber in which the plunger moves, were connected with the bowl of the closet, and it has been found in practice that this chamber, plunger and float become foul by sediment composed of exerementitious matter collecting on them, as well as larger particles lodging in the concealed parts of the closet, in their passage to the trap. The overflow and plunger have a number of different forms. As first invented (Fig. 128), the closet was made in one piece of earthenware. The supply-valve is operated by a float which encircles the top of the plunger. The mouth of the siphon trap is in the shape of an inverted frustum of a hollow cone,

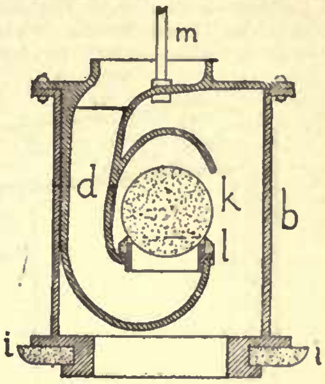


Fig. 130. Fig. 131. — Two forms of Plunger.

b, Plunger. *d*, Overflow. *k*, Ball-valve of rubber. *i*, India-rubber ring. *l*, Rubber-seat with knife edge.

and into this opening the plunger, encircled by a rubber band, fits tightly. The central part of the plunger, which is hollow, and forms the overflow, dips below the water in a small saucer, in this manner forming a water-seal trap. The saucer is suspended from the plunger by means of small hooks and eyes. Jennings on some occasions uses a plunger in which the overflow has a mechanical valve similar to the ball-valve described in connection with the overflow of his valve-closet. This is used in connection with his trapless closet. The ball in this valve is composed of india-rubber, and has its seat on a rubber band or ring, which has a knife edge. On this seat the ball will adjust itself, a slight inequality in the ball, or a small piece of foreign matter making little difference in the efficiency of the joint. A mechanical trap in the overflow is a superfluous precaution, unless the closet is placed in a position where it will be so rarely used that the water-trap might lose its seal by evaporation and thus become inoperative. In a closet like Jennings's, the supply-valve being governed by a float, the bowl would be kept full of water, provided the valve did not get out of order; but the siphon trap under the closet, if the water should evaporate, would allow the gases to get into the room through the plunger-chamber. The Blunt, a water-seal overflow, and the Bowers, a mechanical ball-valve overflow, patent plungers were described by Prof. T. M. Clark (see *American Architect*, No. 142, 1878). He also described the Jennings closet with separate overflow. These closets are so arranged that they may be supplied either from a tank or cistern, or directly from the supply-pipe through one of Jennings's hydrostatic diaphragm supply-valves. This valve is so delicate, and requires such nice adjustment, that it is rarely in proper working order. A. E. Jennings, of New York, furnishes these closets with or without a

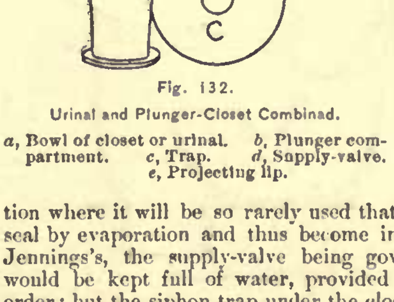


Fig. 132.

Urinal and Plunger-Closet Combined.

a, Bowl of closet or urinal. *b*, Plunger compartment. *c*, Trap. *d*, Supply-valve. *e*, Projecting lip.

[1] Continued from page 234, No. 386.

trap in one piece of earthenware, or with an earthenware bowl, a plunger compartment, and trap or offset of iron. The trap is properly provided with a vent-pipe at the crown, on the side connecting with the soil-pipe.

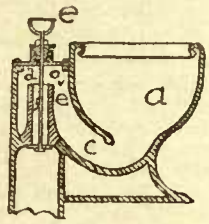


Fig. 133.
Lethem's Closet.
a, Bowl. *c*, Trap. *d*, Plunger-chamber. *b*, Vent. *f*, Overflow.

The Jennings "Night Urinal and Water-Closet" is a fixture, with a high earthenware back and projecting lip, intended to stand without wood-work, made in one piece of earthenware, for bowl, plug, chamber and trap.

For the purpose which Jennings claims utility in his closet, and under such circumstances if they should arise, a closet of this class would undoubtedly be useful. He says: "the object being to save water from sinks, waste-pipes, or other sources where the water-supply will be limited." Jennings's closets have been used extensively in all civilized parts of Europe and America.

Quite a number of English and American inventors have followed in Henry & Campbell's, and Jennings & Lovegroove's steps, making supposed improvements on their closets, the only real improvements being in the form of the supply-valve and in contrivances for flushing the plunger-chamber. The variations consist in the form and position of the supply-valves, plunger-chamber, plugs or plungers, and the overflow. Closets of this class divide naturally into two forms or types, those which follow the Jennings idea having hollow plungers, while the closets which have solid plungers had their prototype in the closets used more than a hundred years ago.

Renison's Plunger.—The second patent for a hollow plunger was issued to Thomas Renison, a plumber of Glasgow, by Great Britain, in 1862. The plunger is so arranged that the pressure of compressed air confined within the plunger will retain the water at any desired height in the bowl; but when the water rises above the height for which the mechanism is arranged, it overcomes the force of the air and flows through the plunger. This plunger is formed by a small cylinder placed within a large one, a space for air being left between them, and the top, to which the hand-pull is attached, is covered over without an opening. The plunger fits into a similar double compartment, which forms a part of the plunger-chamber. This closet is not practicable, as the chamber in which the plunger fits would in a little while be filled with excrementitious matter, so the plunger would be useless.

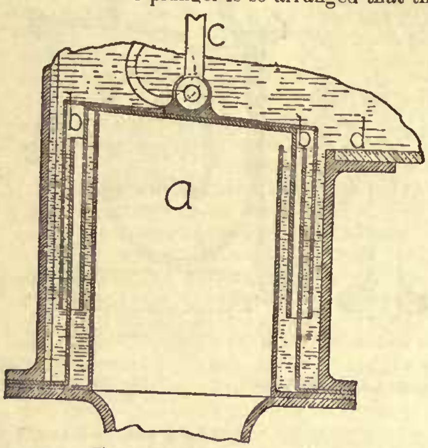


Fig. 134.—Renison's Plunger.
a, Plunger. *b*, Compressed air. *c*, Hand-pull. *d*, Bowl.

Baldwin Latham's Closet.—Baldwin Latham, in his work on sewerage, describes a plunger-closet which he designed as an improvement on the simple hopper-closet. The bowl and plunger-compartment are in one piece. The plunger, which is hollow, retains a large amount of water in the bowl. As is the case in other closets of this class, when the plunger is raised a large body of water is discharged through the soil-pipe, in this manner tending more effectually to scour it than would otherwise be the case. The bottom or outlet from the bowl, and the opening into the soil-pipe are so arranged as to form a water-seal trap. The plunger-compartment has a special vent-pipe, and the bowl a flushing-rim, while the rod connected with the hand-pull passes through a stuffing-box, thus effectually preventing the passage of gas at this point.

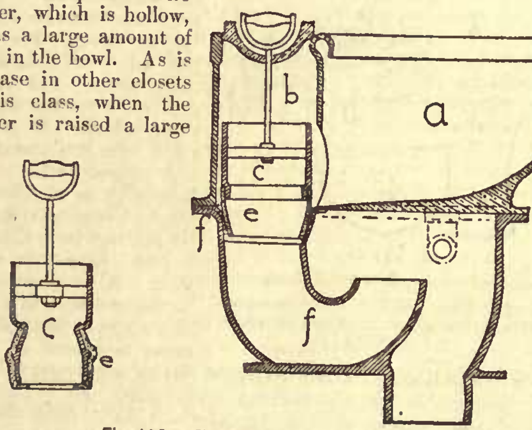
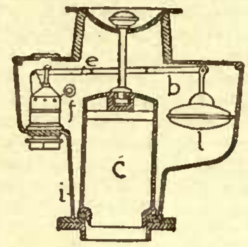


Fig. 135.—Tylor & Sons' Plunger-Closet.
a, Bowl. *b*, Plunger-chamber. *c*, Plunger. *f*, Trap.

Tylor & Sons' Plunger-Closet.—Tylor & Sons, of London, in 1873 invented a plunger-closet, the novelty of which consisted in the form of the plunger and trap under the closet. The plunger is hollow, the hand-pull being attached to it by means of a bar which extends across the plunger on the inside. The bottom of the plunger is bell-shaped, with a ridge encircling it. Over this part of the plunger a rubber cylinder or pouch is stretched. This plunger has its seat on a rubber band. In this manner it is proposed to make a tight joint. The plunger forms the overflow and has its seat on the opening of a U-shaped trap; the other end opens into a chamber which is joined to the soil-pipe. There are a number of corners and hollows in a trap of this kind, that would be sure to collect and retain filth, and for that reason it should be avoided.



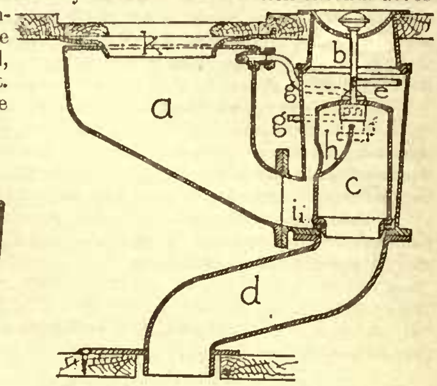


Fig. 136. Demerest's Plunger-Closet. Fig. 137.
a, Bowl. *b*, Plunger-chamber. *c*, Plunger. *d*, Offset. A siphon-trap may be put in same place. *e*, Lever connecting float and supply-valve. *f*, Supply-valve. *g*, Supply-pipe. *h*, Overflow. *i*, Rubber band around the plunger. *k*, Slop-safe or urinal. *l*, Float. *o*, Perforations in supply-valve for washing plunger-compartment.

Demarest's Plunger-Closets.—J. L. Mott & Co. manufacture several forms of plunger-closets: the "Demarest," the "Hygeia," and "Premier." Each has a bowl with a side outlet, while the earliest pattern has a compartment that contains the plunger, a float for governing the supply-valve, and the supply-valve. The plunger is a hollow cylinder closed at the top. The overflow is through an opening in the side, from below which a partition rises to a slight distance above the top of the opening. In this manner a water-seal trap is formed to the overflow. The bottom of the plunger is encircled by a rubber band or ring, which has a seat on the top of the soil-pipe offset or trap. The float is connected with the supply-valve by means of a lever that encircles the rod of the hand-pull, the float and supply-valve being on opposite sides of the plunger, so that the flow of water would be shut off when it had reached the top of the overflow. The upper part of the supply-valve has a row of small holes around it, so arranged as to throw small jets of water into the plunger-chamber. These jets are for the purpose of washing off any sediment or waste matter that may collect on the plunger, float, or the sides of the compartment. This closet has been extensively used in this country, and has been patented both in this country and in England. John Demarest designed the "Hygeia" and "Premier" as an improved form of plunger. The plunger consists of a simple cylinder, open at each end, with a neck formed on the bottom, around which a vulcanized rubber band, circular in section, is stretched. This band enables the plunger to make a tight joint on its seat. The overflow is between the plunger-chamber and the plunger, and forms an opening about an eighth of an inch around the plunger. The hand-pull has a short lever bolted to it, the other end of which is connected by a chain to a tank or cistern, from which the water is conducted by an inch-and-a-quarter pipe to a flushing-rim around the closet; in this manner the sides of the closet are washed more efficiently than they would be with a simple pan.

The "Premier" closet differs from the "Hygeia" only in the fact that it is arranged for a supply-valve instead of for a cistern. The valve is attached to the top of the plunger-chamber, and is operated by a short lever similar to the one used in connection with the tank. These closets have porcelain bowls and enamelled iron

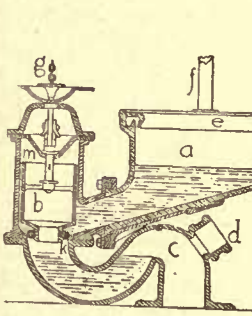


Fig. 138.—Section.

Fig. 139.—Perspective.

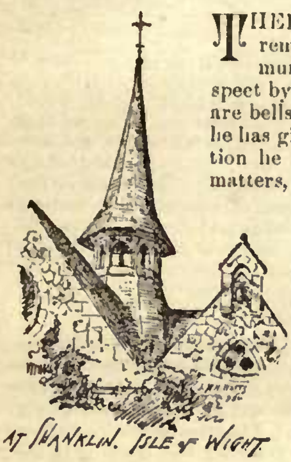
Demarest's Hygeia.
a, Bowl. *b*, Plunger. *c*, Trap. *d*, Vent to trap. *e*, Flushing-rim. *f*, Supply from cistern. *g*, Chain to cistern. *i*, Hand-pull. *k*, Rubber ring. *m*, Plunger-chamber. *o*, Lever.

plunger-chambers, while the plunger and the cover for the chamber, bridge and lever are zinc-coated (galvanized), and put together with brass bolts. The bowl is connected with the other parts of the

closet by means of screw-bolts and clamps. They have above the floor a straight outlet, an offset, or a trap. The trap and offset have an opening at their crown, with a bell into which a vent-pipe must be caulked. Where the trap or outlet passes through the floor there is a broad flange, which is arranged so as to be screwed to the floor over the soil-pipe.

For a plunger-closet, these closets are probably arranged as well as a closet of this class could be made, as they have a small plunger-chamber, no float, a rubber ring on the bottom of the plunger, a flushing-rim to the bowl, a siphon vented trap above the floor; while the different parts are thoroughly put together, well made and of good materials. The only arrangement devised for washing the plunger-chamber consists in the water passing between the plunger and its chamber to the overflow.

BELL-TOWERS.[1]



THERE are some few things as to which the remarks of that amusing gentleman, Sir Edmund Beckett, can be listened to with respect by members of the profession; among these are bells and bell-towers, to the study of which he has given more than the superficial consideration he is wont to give to other architectural matters, and we believe the following remarks will be found of value: —

I proceed to notice a few things relating to bells which are more the business of architects than bell-founders, except that architects now-a-days rather think it their business to ignore everything that has to be done in a building after they have left it. I have known plenty of cases where they knew perfectly well that it was intended to have peals of bells and clocks, and yet have built costly towers without condescending to learn, either by reading or inquiry, what provisions should be made, or even what dimensions were required. That they may have the less excuse, and that those who want church bells may have some idea of what their architects ought to do, I will give the following information as the result of my own experience; and I am probably the only person living who has the experience of designing both bells and clocks, and the towers in which they are to be placed.

It follows from what I said before about bell-frames, that the smallest tower fit for even a small peal of six bells, should be 11 feet square inside; and the smallest for a very moderate peal of eight should be 16 feet. Even these sizes make the ropes hang closer to the walls than they ought to do, and therefore they are much better somewhat larger. Very few *old* towers with eight bells are so small as 16 feet; they are much more frequently 20 feet, and those with six bells at least 14 feet. In what is called "A Book on Building," I have shown how much narrower modern towers generally are than old ones; but I am only now dealing with them as campaniles, which in fact they always are, without reference to architectural reasons in the same direction. Of course when ten or twelve bells are intended, the towers should be larger still, certainly not less than 22 and 24 feet square inside.

There is also another reason for it. Bells sound much better in a large chamber than a small one. Any one who has heard the Doncaster bells will hardly believe that the three bells in All Saints' Church, Margaret Street, are repetitions by the same founders of the first, fourth, and tenor of Doncaster. But the Doncaster bell-chamber is 23 feet square, and Margaret Street not more than 14 feet, or just two-fifths of the area. And the same at All Saints', Halifax, with a spire 240 feet high. The bells, a smaller peal than Burton, could not be got into it on one level.

Another important consideration is the windows. I have known two cases, both in Leeds as it happened, where clock bells had to be re-hung some feet higher up than the architects had provided, because they did not know that the bells ought to be above the sills of the windows. Louvres again are a frequent source of trouble, by being put too close or too much overlapping, even if they are on that ugly and now fashionable foreign plan of having a few enormously wide or deep boards sticking out beyond the face of the mullions, which never were in genuine English architecture. It is no use trying to keep out snow, or even small driving rain, and it does no harm if bell-hangings are kept painted and the floor is made waterproof and drained. Louvres just overlapping will keep out ordinary rain, and I am afraid cannot be dispensed with in church towers, though they are at Westminster, where the floor under the bells is flagged. It is the custom in the eastern counties to put small clock bells quite open on the tops of the church towers, instead of making the clock strike on the tenor of the peal, and they are generally heard farther; in fact, a clock bell (if only a clock bell) cannot be too open, as it has no hangings that will spoil with rain if the hammer gudgeons are occasionally oiled — or even if they are not, for a long time.

There must be two floors between the ringers and the bells, or they cannot hear for the noise. In most towers of good size this can easily be done, but in low central towers it is sometimes difficult. The plan to be adopted then is to lay a strong floor about a foot below the bell-floor by straps from the great beams, and cover it a few inches thick with large gravel, or broken stones (not sand), or else to fill up the whole space between the floors with shavings, including a box full of them for the trap-door which must be left under the great bell. I need hardly say that the great floor beams ought to come under the beams of the bell-frame as much as possible, and should rest on large corbels, and for heavy peals should be strutted also from corbels lower down. This is too often neglected, and a floor made at random, and then the bell-founder is expected to fix a firm bell-frame on a floor not fit to carry it.

But the worst abomination of all, committed by architects and church restorers, is the destroying of the belfry (*i.e.*, ringing chamber) floor for the sake of making a "lantern" of the tower. This has been done at Hereford Cathedral, Ludlow and Boston churches, Merton College Chapel, St. Alban's Abbey, and divers other places. At St. Alban's, where the space is abundant, they have lately re-hung the bells higher up, and so regained a ringing chamber, but not so at the others. At Howden the ringing is done inconveniently and dangerously from a narrow gallery round the tower, and so it is at Merton Chapel — unless they ring from the ground now, as the tower is practically in the ante-chapel. At Pershore, Sir G. Scott did a better thing than a gallery, by the converse of it, a sort of insulated floor, leaving an open space round it except where there is a bridge to reach it. Mr. Cattley and I did much the same at Worcester Cathedral, which was probably the best belfry in England on account of the great width of the tower, 32 feet inside. The much larger central towers of York and Lincoln do not contain the peals of bells; they are in the smaller western towers. In the central tower which I designed for Mr. Bass, at Burton, there are small spandrel windows to light the space under it, as in the grand old church of Hedon, so that the belfry floor can still be at the natural place, about the level of the roofs of the four limbs of the church; and it is 22 feet high. At Doncaster there was height enough above the lower windows of the tower.

But this lanterning mania has destroyed some belfries irreparably, and ringers will not ring long in dark holes about eight feet high, which were only intended for the intermediate chamber or clock-room. That demon of church destruction, under the name of restoration, Wyatt, in the last century and early in this, pulled down the old campanile of Salisbury, and the bells had to be sold because nobody dared ring them in the great overloaded steeple of the cathedral. Well might Pugin say of him, in one of his "restored" churches, "Yes, the monster has been here!"

Where it has become impossible to ring bells properly, the best thing to do is at once to fit them up for chiming only, *i. e.*, tolling with levers. Though inferior to ringing in some respects, and much less interesting to ringers, it has a sweeter sound, but feebler. The clappers ought to be heavier for it, as they strike much softer: especially when there are only three or four bells, chiming sounds much better than ringing. The tolling of three large bells has a very grand sound, and the ringing of two bells only frame high, *i. e.*, swinging up to horizontal, so that they strike quickly, has a pleasant and lively sound. I always admire it at New College Chapel when I visit Oxford.

The windows of bell-chambers, and of every opening in the tower or spire above them, should be completely covered with strong wire netting which must also be kept in repair, to keep out the birds, which otherwise fill the place with sticks and dirt, which caused the second fire at York Minster, and the destruction of the bells. The netting should be of about 18-gauge, woven in squares of half an inch, not in long openings tied with thin wire which soon perishes.

The well-known story of St. Paul's clock being heard at Windsor striking thirteen by a sentinel who was charged with being asleep, is often regarded as fabulous; and so it would be in the present feeble condition of the striking. But Reid says, in his book on clocks, that he heard it there himself, and I have heard an officer quartered there say the same. The Doncaster clock striking on a bell of only thirty hundredweight, has been heard eleven miles in a very flat country. Nobody has yet solved the problem why a wind which you can hardly feel will make the difference of your hearing bells half a mile or ten miles, according as the wind is with you or against.

[1] From "*Clocks and Watches and Bells.*" Crosby Lockwood and Co., 1883.

IRON FURRING-RODS FOR WIRE-LATHING.

NEW YORK, June 4, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — It may interest some of the profession to know that there is a patent held by parties in New York, issued three years since, covering the use of small iron rods as furrings or supports for the ordinary wire-lathing for ceilings in place of the customary wood strips.

As a royalty is exacted for the use of this device, it is interesting to know whether any case can be cited where wire-cloth has been so supported prior to January of 1880. Probably architects and plasterers in Chicago, where large quantities of wire-cloth have been used since the great fire, may be able and willing to give the desired information.

ARCHITECT.

THE GOLDEN BOUGH.

HARTFORD, June 6, 1883.

To the Editors of the American Architect: —

Dear Sirs,— Could you favor me with the legend of "*The Golden Bough,*" as illustrated by Turner in his famous painting of that name? Very truly, AVERNUS.

A QUESTION OF CHARGES.

June 6, 1883.

To the Editors of the American Architect: —

Dear Sirs,— Some months ago I made measurements and scale-drawings of a block of houses which were to be torn down and re-erected in substantially the same form elsewhere. These measurements and drawings were to be used for obtaining bids for the taking down and re-erecting. No specification was made.

At this stage of proceedings the owner decided to employ another architect, who offered to do his work for about half the usual commission.

In making out my bill for services I wish to know the customary charge for such work. The rules for the American Institute of Architects provide for "an additional charge to be made for surveys and measurements," but do not state the amount of such charge. I have thought that the making of the measurements, and the preparation and figuring of the drawings, as was necessary in this case, might be considered equivalent to a preliminary study, for which the regular charge is one per cent on cost of buildings. I would be glad of the opinion of the editors of the *American Architect*, and of others on this question. Very respectfully, ARCHITECT.

[It is hardly possible to judge of the value of the work of which our correspondent speaks. We have known a regular charge of twenty-five dollars to be made for ordinary measurements for alterations of a single building, independent of any work on the drawings, and this is certainly not excessive. For office work, which is not exactly in the line of ordinary commissions, a good and common practice is to keep a record of the time of the persons employed on it, which may, on occasion, serve to fix the cost, and the proper charge to be made.—Eds. American Architect.]

NOTES AND CLIPPINGS.

The Mainmast of the "Ironsides." — A correspondent of a New York paper says; "An incident of early days on the Delaware is always recounted with pleasure by the old inhabitants, and as they vouch for its authenticity it must be true. In 1786 Simeon and Franklin Westfall, of New Jersey, took the contract to furnish the Government with a white-pine tree, which was to be of an extraordinary size, as it was wanted for the mainmast of a war frigate about to be built. They were to receive $100 for the stick. They hunted the Delaware valley from the Neversink to its head-waters, but were unable to find the tree which would answer the specifications of the contract. At last, when they were about to give up the search, they came upon a pine which they believed would suit. It was on an eminence in Pike County, near the present village of Mast Hope, and three miles from the river at Big Eddy. Upon measuring the tree they found that it was too short by ten feet. Upon digging at its root, however, they discovered that the tree ran straight down in the earth, and they succeeded in excavating the lacking ten feet. The tree was felled, hauled to the river, and floated to Philadelphia, and became the mainmast of the frigate Constitution, "Old Ironsides," and carried the American colors in all the glorious victories won by that vessel in the war of 1812."

The Statistics about the Brooklyn Bridge. — The following condensed statement of leading facts about the new structure, compiled by the Boston *Herald*, will be of interest: —

Construction commenced January 3, 1870.
Size of New York caisson, 102′ x 172′.
Size of Brooklyn caisson, 102′ x 168′.
Timber and iron in caisson, 5,253 cubic yards.
Concrete in well-holes, chambers, etc., 5,669 cubic feet.
Weight of New York caisson, about 7,000 tons.
Weight of concrete filling, 8,000 tons.
New York tower contains 46,945 cubic yards masonry.
Brooklyn tower contains 38,214 cubic yards masonry.
Length of river span, 1,595″ 6′.
Length of each land span, 930′ 1,860″.
Length of Brooklyn approach, 971′.
Length of New York approach, 1,562′ 6″.
Total length of bridge, 5,989′.
Width of bridge, 86′.
Number of cables, 4.
Diameter of each cable, 15¾″.
First wire was run out May 29, 1877.
Cable making really commenced June 11, 1877.
Length of each single wire in cables, 3,579′.
Length of wire in four cables, exclusive of wrapping wire, 14,371 miles.
Weight of four cables, inclusive of wrapping wire, 3,588½ tons.
Ultimate strength of each cable, 12,200 tons.
Weight of wire, nearly 11 feet per pound.
Each cable contains 5,296 parallel, not twisted, galvanized steel oil-coated wires closely wrapped to a solid cylinder 15¾″ in diameter.
Depth of tower foundation below high water, Brooklyn, 45′.
Depth of tower foundation below high water, New York, 78′.
Size of towers at high water line, 59′ x 140′.
Size of towers at roof course, 53′ x 136′.
Total height of towers above high water, 278′.
Clear height of bridge in centre of river span above high water at 90° Fahrenheit, 135′.
Height of floor at towers above high water, 119′ 3″.
Grade of roadway 3¼′ in 100′.
Height of towers above roadway, 159.
Size of anchorages at base, 119′ x 129′.
Size of anchorages at top, 104′ x 117′.
Height of anchorages, 89′ front, 85′ rear.
Weight of each anchor plate, 23 tons.

Utilization of Cinders and Coal Refuse. — Noack Dollfus has prepared a valuable paper upon the preparation of *béton* from slag and other refuse, by the addition of about twenty per cent of lime. By using the methods and precautions which he points out, foundation walls and superstructures of great strength and durability can be made.—*Société Industrielle de Mullhouse.*

Miniature Artificial Cyclones. — For several years Professor Douglas, of Ann Arbor University, has been manufacturing them. He does it in a very simple manner, by suspending a large copper plate by silken cords. This plate is charged heavily with electricity, which hangs down like a bag, underneath, and is rendered visible by the use of arsenious acid gas, which gives it a green color. This formation is a miniature cyclone as perfect as any started in the clouds. It is funnel shaped and whirls around rapidly. Passing this plate over a table, the five-cent cyclone snatches up copper cents, pens, pith-balls and other objects and scatters them on all sides. The experiment is often made in Ann Arbor, and all the students are familiar with it.—*Kansas City Journal.*

The Rue du Jour, Paris. — One of the oldest streets in Paris is about to disappear, as the Rue du Jour, near the Church of St. Eustache, which dates from the thirteenth century, will shortly be demolished, in connection with the improvements which are being made in this part of Paris. The Rue du Jour, so named on the *lucus a non lucendo* principle, was very narrow and gloomy, and the only building of any historic interest is an old house now used as a china warehouse, which was known two hundred years ago as the Hôtel Royaumont, and was at that time the residence of Philippe Hurault, Abbot of Royaumont. At his death it became the property of François de Montmorency, who turned it to a very singular use, making it the trysting-place of all persons who were about to fight a duel, as lately detailed in these pages.

Old Castings. — The art of casting in metal is so dependent on the clay model from which the mould is obtained that it might almost be assumed *à priori* that improvement in plastic art would necessarily lead to a great development of metallurgical skill, and accordingly we find two celebrated Samian artists, Theodorus and Rhœcus, credited with the invention of casting in bronze at a date probably not many years distant from that of Butades. When ancient writers speak of casting in metal as the invention of the two Samian artists, we must understand by this statement that improved kind of casting in which the metal is poured between the mould and a central core, and which is called hollow casting, in contradistinction to the more primitive process in which the molten metal entirely fills the mould, and which is therefore called solid casting. We know that this clumsier solid casting was familiar to the Egyptians, the Phœnicians, and the Assyrians, centuries before the time of Theodorus, and we find it used for the handles of large bronze craters in Mycenæan tombs, and in small figures such as are found in the lowest stratum of the soil of Olympia. It was, however, unsuitable for statues on a large scale on account of its great weight and cost; therefore it was that most Greek statues in bronze were originally made of separate pieces of metal hammered out on a mould, and then nailed together over a wooden core. Such figures, called *sphyrelata*, or hammered work, were still extant in Greek temples in the time of Pausanias. The invention attributed to Theodorus and his brother substituted for this primitive kind of metallurgy an easier and surer process, which after having been brought to an extreme perfection by the Greeks, has been handed down to modern times with little (if any) improvement in its technical processes. —*C. T. Newton, in the National Review.*

Inspecting the Channel Tunnel. — The channel tunnel was officially inspected May 23, by the Parliamentary Committee. The visitors, who arrived at Dover by the Brussels express from London, included the Marquis of Lansdowne, the Earl of Devon, Lord Aberdare, Lord Barrington, Lord Camperdown, Sir Hussey Vivian, Sir Massey Lopes, Mr. A. Peel and Mr. Baxter. At Dover the party was joined by Major-General Newdigate, C. B., commanding the Southeastern District, and his staff, including Colonel Buchanan, Assistant Adjutant-General; Colonel Knight, Assistant Quarter-Master-Gen.; Mr. Bartley Frere, Aide-de-camp; Colonel Gordon, commanding Royal Engineers, and other officials of the Royal Artillery and Royal Engineers, who were specially detailed, at the request of the Secretary of State, to accompany the committee on their visit of inspection. A special train conveyed the party from Dover to the works at Shakespeare's Cliff, where preparations for the visit had been going on for some days. After the machinery had been inspected on the piece of table-land above the works, the visitors proceded down the shaft to the heading, conducted by Mr. Shaw, Secretary of the Southeastern Railway Company. The heading was lighted by means of the electric light, and a careful inspection was made along the entire length of the tunnel, a distance of about a mile and a quarter. The heading was quite dry and had very much the same appearance in this respect as it had when the works were in full operation. On the party reaching the end of the tunnel the boring machine was set in motion for a few revolutions for the information of the committee. Of course, any observations with regard to the strategical bearing of the undertaking were carefully avoided, but there appeared to be but one opinion as to its practicability, and general interest was manifested in the works. After spending upwards of an hour and a half at the tunnel the party partook of luncheon at the Lord Warden Hotel, and then drove to the site where it is proposed to make the entrance to the tunnel, some two or three miles inland. The party afterwards visited the fortifications at the Castle, which would practically command the tunnel entrance. Particulars and observations were specially taken with regard to the existing defenses and the proposed route and exit from the tunnel, and upon the question of defense generally. — *London Standard.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

278,692. DOOR-HANGER. — Lloyd Eberhart and Irving D. Stevens, Joliet, Ill.

278,704. DOOR-KNOB ATTACHMENT. — William F. Hall, Boston, Mass.

278,719. DOOR-LOCK. — John Mathisen, Christiana, Norway.

278,722. ROOFING-FABRIC. — Henry M. Miner, Pittsburgh, Pa.

278,723. SEWER CAP AND JOINT. — Alexander Monteath, Chicago, Ill.

278,736. GRATE-BLOWER. — Chas. A. Preston, Norwalk, O.

278,739. HYDRAULIC AND OTHER ELEVATORS. — Gustavus N. Reiff, Philadelphia, Pa.

278,751. DRIVEN WELL. — Gehyleman Shaw, Bridgeport, Conn.

278,763. FIRE-ESCAPE. — Henry L. Barnard, Greenfield, Mass.

278,768. FIRE-ESCAPE. — John S. Bowman, Detroit, Mich.

278,783. DOOR-SPRING. — Geo. W. Downes, New York, N. Y.

278,791. FIREPLACE AND CHIMNEY. — William C. Hammer, Morganfield, Ky.

278,802. SASH-FASTENER. — John Kubler, Hot Springs, Ark.

278,807. FIRE-ESCAPE. — Chas. F. Marskey, East Saginaw, Mich.

278,820. FIRE-ESCAPE. — Jacob Reese, Pittsburgh, Pa.

278,839. SEWERING AND DRAINING TOWNS. — Geo. E. Waring, Jr., Newport, R. I.

278,847. FIRE-ESCAPE. — Christian E. Baker, Chicago, Ill.

278,863. DOOR-SECURER. — Amos Boucher, Monclova, O.

278,865. FIRE-ESCAPE. — Marvin N. Brainard, Hartford, Conn.

278,932. SOLDERING-IRON. — John Gibbons, West Troy, N. Y.

278,974. ELEVATOR-GUARD. — J. Jerome Knapp, South Gardner, Mass.

279,006. STRIKING-PLATE FOR LOCKS. — Emery Parker, New Britain, Conn.

279,011. FIRE-PROOFING AND FURRING DEVICE. — George B. Phelps, Washington, D. C.

279,024. AUTOMATIC SAFETY-BRAKE FOR ELEVATORS. — Wright J. Seaton, Wyandotte, Kan.

279,048. WATER-CLOSET. — William Tweeddale, Brooklyn, N. Y.

279,054. FIRE-EXTINGUISHER. — George F. Wagner, Omaha, Neb.

279,064. BURGLAR-ALARM AND DOOR-BELL. — Louis E. Williams, Peekskill, N. Y.

279,111. BLIND-STOP. — Charles F. Vandervoort, Corpus Christi, Tex.

279,112. LOCK. — Oscar H. Woodward, and Orrin L. Woodward, Clinton Junction, Wis.

SUMMARY OF THE WEEK.

Baltimore.

CHURCH. — Canton M. E. Church, brick and stone, 46' x 70'; style, Gothic; seating capacity, four hundred; cost, $15,000; Chas. L. Carson, architect.

BUILDING PERMITS. — Since our last report twenty permits have been granted, the more important of which are the following: —

W. H. Sharp, two-st'y brick building, n s Fayette St., between Crooked Lane and Little Sharp St.

Alex M. Briscoe, 6 two-st'y brick buildings, w s Gilmor St., between McHenry and Pratt Sts.

John S. Smuck, 5 two-st'y brick buildings, w s Calhoun St., s of Pratt St.

Chas. Q. Ranft, three-st'y brick building, n e German St., between Pine and Fremont Sts.

Wm. A. Hammond, 5 three-st'y brick buildings, n s Hoffman St., between Division St. and Brewer Alley; and 4 three-st'y brick buildings, n s Hoffman St., between Pennsylvania Ave. and Brewer Alley; and 4 three-st'y brick buildings, e s Brewer Alley, n of Hoffman St.

W. H. Yeatman, 13 three-st'y brick buildings, s s Saratoga St., commencing s e cor. Arlington Ave.; and 15 three-st'y brick buildings, e s Arlington Ave., s of Saratoga St.

Boston.

BUILDING PERMITS. — *Brick.* — *Tremont St., Nos.* 463 *and* 465, Ward 16, for Gibson & Allen, tenement and store, 24' x 44', four-st'y flat; J. E. Potter, builder.

Commonwealth Ave., No. 223, near Exeter St., Ward 11, for Geo. Higginson, dwell., 26' x 75', five-st'y mansard; Weston & Shepard, builders.

Tremont St., Nos. 459 *and* 461, Ward 18, for Mary S. Knowlton, dwell. and store, 24' x 46', four-st'y flat; J. E. Potter, builder.

Marlborough St., between Exeter and Fairfield Sts., for Geo. R Minot, dwell., 30' x 76', four-st'y mansard; Woodbury & Leighton, builders.

Wood. — *Waumbeck St.*, near Warren St., Ward 21, for Neil McNeil, dwell., 26' x 40', two-st'y pitch; McNeil Bros., builders.

Clapp Pl., near Boston Pl., Ward 24, for Frederick Weis, dwell., 23' x 30' and 16' x 18', two-st'y pitch; Wm. Eadie, builder.

Boston St., near Dudley St., Ward 20, for Samuel B. Pierce, dwell., 22' x 32', two-st'y pitch; Wm. J. Jobling, builder.

Heath St., near Lawn St., Ward 22, for Patrick Owens, dwell., 22' 6" x 39', three-st'y pitch; Samuel Rankin, builder.

Brown Ave., rear, near Ashland St., Ward 22, for Frank B. Skelton, poultry-house, 15' x 40', one-st'y pitch; Frank B. Skelton, builder.

Old Harbor St., Nos. 25 *and* 27, Ward 15, for Dennis Reardon, 2 dwells., 20' x 34' and 13' x 17', two-st'y mansard; Wm. M. Henderson, builder.

East Third St., No. 724, Ward 14, for John H. Walker, dwell., 21' x 30' and 13' x 17', two-st'y mansard; David A. Berry, builder.

Parkman St., near Adams St., Ward 24, for Darius Eddy, dwell., 21' and 26' x 29' and 14' x 16', two-st'y pitch; Studley Bros., builders.

Brown Ave., near Ashland St., Ward 23, for J. E. Blakemore, dwell., 19' and 26' x 24' and 34', two-st'y pitch; Alexander Rogers, builder.

Metropolitan Ave., near Hilburn St., Ward 23, for Thomas H. Cummings, dwell., 16' and 29' x 34', two-st'y pitch; John B. McAleed, builder.

Storey Pl., near Greenough Ave., Ward 23, for Edwin Sherwin, dwell., 30' and 32' x 34' and 17' x 22', two-st'y pitch.

Lamartine St., near Roys St., Ward 23, for Edmund H. Cook, dwell., 27' x 32', three-st'y flat; John L. Dakin, builder.

Rutherford Ave., e s, near Mills St., Ward 4, for David Stearns, wagon-house, 20' x 35' and 30' x 35', one-st'y flat; Robert Wiley, builder.

Washington St., opposite Lake St., Ward 25, for Jacob T. Taylor, dwell., 23' x 32', two-st'y pitch; J. C. Wadleigh, builder.

Jamaica St., near Woodman St., Ward 23, for John L. Cheney, dwell., 20' x 26', two-st'y pitch; E. A. Carter, builder.

Wayne St., near Maple St., Ward 21, for Edward A. Pierce, dwell., 29' and 35' x 40' and 16' x 17', two-st'y pitch; S. E. Potter, builder.

Walnut Park, rear, Ward 23, for Charles M. Clapp, stable, 40' x 44', one-st'y hip; Wm. H. Stewart, builder.

Washington St., Nos. 3107 *and* 3109, for Francis W. Kittredge, dwell. and store, 20' and 26' x 54', two-st'y mansard.

Washington St., Nos. 3111 *and* 3113, for Francis W. Kittredge, dwell. and store, 11' and 26' x 61', two-st'y mansard; Charles H. Wetmore, builder.

Washington St., rear, near Newton Line, for Joseph Davis, dwell., 14' and 20' x 21' and 33', two-st'y pitch; McNeil Bros., builders.

Washington St., near Albano St., Ward 23, for John Brown, dwell., 16' and 20' x 21' and 30', two-st'y pitch; John B. McKay, builder.

Erie Ave., opposite Merrill St., Ward 24, for Catherine E. Gigie, 2 dwells., 20' x 25', two-st'y flat; John H. Gigie, builder.

Maine St., Nos. 149 *and* 151, cor. Warren St. and Thompson Sq., Ward 5, for Maurice Hart, dwell. and store, 26' and 31' x 45' and 56', four-st'y flat; J. W. Burckes, builder.

Phipps St., No. 19, Ward 5, for E. D. Brooks, storage, 18' x 50', one-st'y flat; —— Harmon, builder.

Union Ave. No. 46, rear, near Green St., Ward 23, for Michael Maloney, stable, 22' x 30', one-st'y pitch; John B. McKay, builder.

Market St., near Faneuil St., Ward 25, for Edward Keenan, dwell., 22' and 32' x 35', two-st'y pitch; Daniel M. O'Connell, builder.

Savin Hill Ave., near Grampian Way, for Geo. E. Scott, stable, 22' x 26', one-st'y pitch; David A. Berry, builder.

Erie Ave., nearly opposite New Seaver St., Ward 24, for Wm. H. Wallace, 2 dwells., 20' x 42', three-flat; John H. Gigie, builder.

Dorchester St., No. 360, Ward 15, for Daniel Sande, dwell. and store, 33' x 38' and 16' x 38', two-st'y mansard; A. Crawford, builder.

Brooklyn.

BUILDING PERMITS. — *Park Ave., Nos.* 700 *to* 708, n s, 125' w Tompkins Ave., 5 three-st'y frame double tenements, tin roofs; cost, each, $4,000; owner, Andrew Froelich, 202 Stockton St.; architect, T. Engelhardt; builders, A. Sachs and H. Loeffler.

Marcy Ave., s e cor. Monroe St.; also, *Marcy Ave.*, n e cor. Madison St., 2 three-st'y brownstone front stores and tenements, tin roofs; cost, about $7,000 each; owner, architect and builder, F. C. Vrooman, 444 Gates Ave.

St. James Pl., Nos. 84 *to* 94, w s, 50' n Greene Ave., 6 three-st'y brick dwells., tin roofs; cost, each, $7,500; owner, Thomas T. Thorp, 379 Washington Avenue; architect, A. H. Thorp; builders, W. J. Reynolds & Son and Mills & Bush.

Evergreen Ave., w s, 50' n Woodbine St., 3 two-st'y frame dwells., tin roofs; cost, each, $2,000; owner and architect, Jno. F. Ehlers, 94 Sumpter St.; builders, W. Welch and W. M. Whitenack.

Bedford Ave., e s, 42' s Jefferson St., 3 four-st'y brownstone front flats, tin roofs; cost, total, $21,000; owner and builder, S. E. C. Russell; architect, I. D. Reynolds.

Dodworth St., s s, 156' 4" Broadway, two-st'y frame tenement, tin roof; cost, $3,000; owner and builder, Albert F. Fitch, 216 East Tenth St., New York City; architect, J. Herr.

Monroe St., n s, 100' e Reid Ave., 2 two-st'y brownstone front dwells., tin roofs; cost, each, $3,500; owner, architect and builder, Geo. F. Chapman, 15 Kosciusko Pl.

Union St., n s, 293 w Seventh Ave., 2 four-st'y brownstone front tenements, gravel roofs; cost, each, $6,000; owner, Geo. M. Brown, 728 Fulton St.; builder, L. E. Brown.

North Seventh St., n s, about 150' w First St., two-st'y brick storehouse, gravel roof; cost, $10,000; owners, Dick & Meyer, on premises; architect, E. F. Gaylor; mason, Jas. Rodwell; carpenter not selected.

Broadway, n e cor. Suydam St., three-st'y brick store and tenement, tin roof; cost, $8,000; owner, —— Aube, New York City; architect, T. Engelhardt; builder, F. Herr.

Court St., s w cor. Remsen St., two-st'y freestone front bank, roof of asphalt and slate; cost, $130,000; owner, Dime Savings Bank, 367 Fulton St.; architect, Mercein Thomas; builders, J. D. Anderson and Hartt & Boyd.

Eighteenth St., No. 491, n s, 100' w Ninth Ave., three-st'y brick tenement, tin roof; cost, $3,700; owner, Ellen Kirwan, 493 Eighteenth St.; architect, W. Wirth; builders, J. Sharock and J. Van Syckle.

Hart St., s s, 100' w Lewis Ave., two-st'y brick dwell., tin roof; cost, $3,500; owner, Mary Reilly, 1076 Lafayette Ave.; architect and builder, M. McCarty.

Ralph Ave., s w cor. Chauncey St., one-st'y frame chapel; cost, $10,000; owner, Central Congregational Society, E. H. Crampton, President Board of Trustees, Hancock St., near Franklin Ave.; architect, G. L. Moore.

Fifteenth St., No. 227, n s, 140' e Fifth Ave., three-st'y frame tenement, tin roof; cost, $4,000; owner, Christian Stohr, 295 Thirteenth St.; architect and builder, Jos. Sealy.

St. John's Pl., s e, 100' w Eighth Ave., 7 three-st'y brownstone front dwells., tin roofs; cost, each $9,000; owner, Henry Lansdell, Ninth St., cor. Fifth Ave.; architect, C. B. Sheldon.

State St., s s, 100' n Smith St., four-st'y brick double tenement, tin roof; cost, $5,000; owner, Thos. Colson, 281 Atlantic Ave.

North Seventh St., n s, 150' e Second St., four-st'y brick double tenement, tin roof; cost, $8,000; owner, Patrick Murray, 99 North Seventh St.; architect, E. F. Gaylor; builders, Matt Smith and Gilmore & Trevor.

Penn St., n s, about 150' w Lee Ave., three-st'y brownstone front dwell., tin roof; cost, $10,000; owner, Andrew Brown, on premises; architect, E. F. Gaylor; builders, T. Gibbons and Gilmore & Trevor.

Boerum Pl., e s, 150' n Dean St., four-st'y brick flat, gravel roof; cost, $8,000; owner and builder, Jno. Denithorne, Dean St., near Grand Ave.; architect, R. Dixon.

Freeman St., s s, 215' e Oakland St., three-st'y frame dwell., tin roof; cost, $4,000; owner, Jos. Krekey, 362 Oakland St.; architect, J. Platte; builders, H. Grasman and J. Rueger.

Chicago.

HOUSES. — Messrs. Burnham & Root, architects, have plans for Mr. J. H. Dow for two-st'y brick house.

Same architects have plans for two houses for Mr. Robert Strahan.

Also, on Prairie Ave., near Twenty-sixth St., brick dwell., stone finish, for Mr. T. R. Burch.

CHURCH. — W. L. B. Jenney, architect, has plans ready for St. Paul Episcopal Church, at Riverside; cost, $10,000. Ground was broken 6th of June.

STORE. — Mr. Henry Sierks, architect, is building, for Samuel Johnson and Samuel Springer, three-st'y store and flat building, Nos. 475 and 477 Blue Island Ave., St. Louis pressed-brick, with stone finish; cost, $20,000.

FACTORY. — Mr. Henry Sierks, architect, is building a four-st'y factory, 50' x 156', brick, for the Northwestern Parlor Furniture Manufacturing Co.; cost, $18,000.

WAREHOUSE. — Mr. H. Sierks, architect, has plans for four-st'y brick warehouse, engine-room, and boiler-house, for Mr. H. Bartt; cost, $12,000.

BUILDING PERMITS. — Thos. Sutton, two-st'y dwell., 25' x 60', 234 Leavitt St.; cost, $5,500.

Mrs. Huber, 2 two-st'y store and dwell., 22' x 55', Cottage Grove Ave.; cost, $5,200.

Geo. A. Weiss, six-st'y brick malt-house and elevator, 1 0' x 110', Bloomingdale Ave.; cost, $100,000.

Schwarz & Keies, two-st'y flats, 61' x 88', 2942-2918 Grove St. and Park Ave.; cost, $20,000.

Wm. Noll, two-st'y basement dwell., 22' x 45', 2821 s s K Ave.; cost, $3,000.

F. Charat, two-st'y basement dwell., 20' x 50', 826 Allport St.; cost, $3,000.

J. V. Hawkins, three-st'y flats, 21' x 71', 184 Cass St.; cost, $14,000.

L. H. Sass, two-st'y and attic dwell. and barn, 22' x 71', 847 West Monroe St.; cost, $9,000.

Wm. Fleming, 4 two-st'y dwells., each 25' x 70', 178 South Morgan St.; cost, $20 000.

Kummer & Corliss, 2 two-st'y dwells., each 25' x 60', 343 and 345 Ashland Ave.; cost, $11,000.

E. Sarrfield, three-st'y brick flats, 24' x 60', 398 Garfield Ave.; cost, $6,000.

John Krueger, three-st'y basement dwell., 22' x 72', 7 Will St.; cost, $5,000.

E. Destifano, three-st'y basement store and dwell., 24' x 100', 416 South Clark St.; cost, $5,000.

A. C. Junet, 2 two-st'y basement dwells., 38' x 41', 643 South Wood St.; cost, $6,500.

Richard Knisely, three-st'y basement stores and flats; 35' x 75', 881 Lake St.; cost, $10,000.

H. Zimmerman, two-st'y dwell., 21' x 60', 736 North Paulina St.; cost, $3,500.

Fred. Putzel, two-st'y basement dwell., 20' x 50', 560 Nineteenth St.; cost, $3,000.

G. M. E. Church, church, 32' x 42', Thirty-first St; cost, $3,500.

Aug. Schultz, two-st'y dwell. and store, 27' x 60', 3848 Cottage Grove Ave.; cost, $8,000.

S. V. A. Weaver, three-st'y flats, 20' x 75', 213 Illinois St.; cost, $8,000.

Meacham & Wright, two-st'y dwell., 25' x 70', 567 West Jackson St.; cost, $7,000.

Britten & Guth, 2 two-st'y basement dwells., each 23' x 58', 3412 South Park Ave.; cost, $12,000.

Peter Adler, three-st'y brick flats, 24' x 66', 267 East Huron St.; cost, $8,000.

Cincinnati.

BUILDING PERMITS. — Adams Express Co., three-st'y brick building, n e cor. Seventh St. and Broadway; cost, $40,000.

Frank Walton, three-st'y frame building, n w cor. Harrison and Culvert Sts.; cost, $5,0 0.

Miss Mary Meyer, three-st'y brick building, 157 Dayton St.; cost, $8,000.

Adam Smith, two-and-a-half-st'y brick building, Freeman Ave.; cost, $5,000.

Est. Jas. W. Gaff, four-st'y stone front building, cor. Plum and Perry Sts.; cost, $14,0 0.

A. S. Ludlow, 2 two-st'y frame buildings, Fairmount St.; cost, $5,000.

Miss Mary Weyholl, three-st'y brick building, Sycamore St.; cost, $3,000.

A. C. Barney, four-st'y brick building, Backer St.; cost, $8,000.

Permits for repairs; cost, $13,025.

Grand Rapids, Mich.

PROSPECTS. — The work of building neat, cosy cottages and homes is booming in the Fifth Ward, and that section of the city is growing very rapidly, as well as all other parts of the city. Never before in the history of Grand Rapids has there been anything like the boom in the building of residences that there is now. It is fair to predict that fully twelve hundred new dwellings will be built here this season.

FACTORY. — The Gleason Wood Ornament Company has begun the erection of its new factory, 50' x 80', two stories high, of brick, besides its engine and boiler-house.

A brick addition to the Phœnix Furniture Factory.

HALL. — Mrs. Ball is building a hall for public purposes, which will seat one thousand persons, on Canal St.

HOTELS. — A hotel is being built near the D. G. H. & M. Junction, costing about $5,000.

Work has commenced on the new Eagle Hotel, costing, when completed, about $30,000.

HOUSES. — Mr. F. P. Gilbert is preparing to build a frame house on College Ave.; cost, about $6,000.

Conductor Moran, of the G. P. & I. R. R., is about to build a new house on Lagrave St., to cost about $3,000.

Conductor Flaherty, of the G. R. & I. R. R., is preparing to build a frame house on South Division St.; cost, $2,000.

Henry Carr is building a house on cor. of Lafayette and Washington Sts.; cost, about $4,000.

Geo. N. Munson is to build a cottage on Jefferson Ave., near Fulton St.; cost, $3,000.

Mr. Chas. P. Rathbun is building a cottage at the cor. of Washington St. and Madison Ave., costing $3,500.

Mr. Ransom Luce is building a cottage on the west cor. of Jefferson Ave.; cost, about $3,000.

Dr. Chas. Hazeltine is building a house on Cherry St.; cost, $3,500.

OPERA-HOUSE. — Very important changes are to be made this summer in Powers's Grand Opera-House.

STORES. — Messrs. Kromer & Sons are building a two-st'y block on Plainfield Ave., costing $5,000.

Messrs. Rathbun & Boorhem are building a new brick block on Waterloo St.; cost, $15,003.

Among the most expensive houses now in process of construction in this city, or soon to be, are the following: —

Wm. McMullen, cor. of Fountain St. and College Ave.; cost, $10,000.

C. Bertsch, cor. of Bronson and Lafayette Sts.; cost, $10,000.

Robert B. Woodcock, cor. Cherry and Sheldon Sts.; cost, $10,000.

Mrs. Alice Twamley, cor. Lafayette and Washington Sts.; cost, $7,000.

Geo. H. White, Fountain St.; cost, $10,000.

TENEMENTS. — Mr. Julius Berkey is building a new tenement-house on Fountain St., costing $10,000.

New York.

BUILDING PERMITS. — *East One Hundred and Ninth St., No.* 317, five-st'y brick tenement, tin roof; cost, $7,000; owner, Hugo Siller, One Hundred and Thirty-ninth St., near Third Ave.; architect, John Rogers.

Roosevelt St., Nos. 3, 5 *and* 7, five-st'y brick tenement and stores, tin roof; cost, $18,000; owners, William D. Foulke and ano , Richmond, Ind.; architects, D. & J. Jardine; builders, Peter Tostevin's Sons.

East One Hundred and Ninth St., Nos. 162, 164 *and* 166, 3 five-st'y brownstone front tenements, tin roofs; cost, each, $16,000; owner, Peter Cain, 209 East Twenty-ninth St.; architect, Joseph M. Dunn; done by days' work.

One Hundred and Forty-third St., n s, 558' 4" e Willis Ave., 5 two-st'y frame dwells., tin roofs; cost, each, $2,200; owner, Charles Van Riper, 683 East One Hundred and Forty-third St.; architect, H. S. Baker

Lexington Ave., n w cor. One Hundred and Seventeenth St., four-st'y brick tenement and store, tin roof; cost, $10,000; owner and builder, John W. Warner, One Hundred and Sixth St., cor. Fifth Ave.; architect, Wm. Graul.

Lexington Ave., w s, 20' n One Hundred and Seventeenth St., four-st'y brick tenement, tin roof; cost, $9,000; owner, builder and architect, same as last.

Lexington Ave., w s, 39' n One Hundred and Seventeenth St., four-st'y brick tenement, tin roof; cost, $11,000; owner, builder and architect, same as last.

Lexington Ave., w s, 61' n One Hundred and Seventeenth St., four-st'y brick factory, tin roof; cost, $4,800; owner, builder and architect, same as last.

Fifteenth St., s s, 75' w Seventh Ave., four-st'y brick tenement and store, tin roof; cost, $7,500; owner, John Rushmeyer, s w cor. Fifteenth St. and Seventh Ave.; architect, Wm. Jose.

West Fifty-fifth St., Nos. 140, 142, 144 *and* 146, three-st'y brick building for studios, apartments, and stable, tin and slate roof; cost, $50,000; owner, A. H. Barney, 82 Broadway; architect, Bassett Jones; builder, L. N. Crow.

Mott Ave., No. 395, 2 two-st'y frame buildings, factory and boiler-house, shingle and tin roofs; cost, total, $3,500; owner, C. J. Brordbach, on premises.

Eighth Ave., n e cor. One Hundred and Twenty-fourth St., 5 five-st'y brick flats and stores; cost, total, $85,000; owner, Alva S. Walker, 43 West One Hundred and Thirtieth St.; architect, Thos. E. Thomson.

West Twentieth St., No. 227, five-st'y brick tenement, tin roof; cost, $10,000; owner and builder, Wm. S. Wright, 36 West Twenty-seventh St.

Sixty-eighth and Sixty-ninth Sts., Lexington and Third Aves., interior court of Foundling Asylum, one-st'y and basement brick chapel, slate and galvanized-iron roof; owners, Sisters of Charity, on premises; architect, Wm. Schickel; builders, Terence Kiernan and John Downey.

Broadway, Nos. 876 *and* 878, six-st'y brick store, slate and tin roof; cost, $55,000; owner, David S. Hess, 35 West Twenty-third St.; architect, Henry Fernbach; builders, Alex. Brown, Jr., and J. J. Brown.

Eighty-ninth St., n s, 133' 4" e Fourth Ave., 2 five-st'y brick tenements, tin roofs; cost, each, $20,000; owner, Ellen Broas, Haverstraw, New York; architects, Cleverdon & Putzel.

Worth St., No. 143, seven-st'y brick store, tin roof; cost, $34,000; owner, Andrew Dougherty, 80 Centre St.; architect, Geo. T. Powell; builders, Jas. T. Stevenson and Martin Barry.

Second Ave., w s, 100' 11" s One Hundred and Twenty-second St., three-st'y brick tenements and stores, tin roof; cost, $20,000; owner, Philip Doran, 365 Pleasant Ave.; architect, J. C. Babcock; builder, I. Lyon.

West Fiftieth St., Nos. 409 *and* 411, 2 five-st'y brownstone front tenements, tin roofs; cost, each, $12,000; owner, John Fresch, 407 West Fiftieth St.; architect, Wm. Graul.

East Fortieth St., No. 332, five-st'y brick tenement, tin roof; cost, $13,000; owner, Joel B. Smith, 954 East One Hundred and Thirty-eighth St.; architect and builder, Frank E. Smith.

West Sixteenth St., No. 313, five-st'y brick tenement, tin roof; cost, $8,000; owner and builder, same as last.

Canal St., No. 274, four-st'y brick store, tin roof; cost, $12,000; owners, Emma D. Van Vleck and Helen D. Adams, extrxs., 110 East Seventy-eighth St.; architect, A. B. Ogden.

ALTERATIONS. — *State St., No.* 6, raise attic to full story, new flat roof, and two-st'y brick extension; also, interior alterations; cost, $15,000; owner, Jos. F. Chatelier, 116 East Sixteenth St.; architect, A. B. Ogden; builders, D. & E. Herbert.

Fifth Ave., No. 434, alter basement front; cost, $3,000; owner, J. N. Burton, Newburg, N. Y.; architects, D. & J. Jardine.

Madison Ave., No. 93, five-st'y brick extension; cost, $10,000; owner, Thos. A. Emmett, M. D., on premises; architect, Chas. R. Jackson.

Philadelphia.

BUILDING PERMITS. — *Poplar St.*, n s, 65' e Sixteenth St., 2 three-st'y dwells., 16' x 65'; Jno. K. McCurdy.

Twenty-first St., n w cor. Berks St., 10 three-st'y dwells., 16' x 48'; J. L. Carre, owner.

Hancock St., No. 2528, two-st'y dwell., 18' x 48; Daniel Nevling, contractor.

Smedley St., above Thirty-sixth St., two-st'y stable, 24' x 48'; Firman Bros., contractors.

Washington St., n w Fountain St., three-st'y dwell., 18' x 34'; Mrs. C. L. Soberheimer, owner.

James St., n e Bridge St., three-st'y dwell., 16' x 46'; J. S. Taylor, contractor.

Ashton St., near Penn St., 2 two-st'y dwells., 18' x 34' and 17' x 47' C. L. Linahan, contractor.

Garnet St., near Lehigh Ave., two-st'y dwell., 30' x 30'; C. S. Quigley & Co.

North Twentieth St., No. 1416, three-st'y dwell., 16' x 41'; Henry Moore, owner.

Gowan Ave., n s, and Chestnut Hill Railroad, three-st'y dwell., 32' x 47'; Tourison Bros. contractors.

Gowan Ave., s s, and Chestnut Hill Railroad, 2 three-st'y dwells., 38' x 40'; Tourison Bros., contractors.

Pine St., n e cor. Franklin St., 4 two-st'y dwells., one with store, 16' x 38'; Adam Mann, owner.

Hull St., n e cor. Amber St., 6 two-st'y dwells., 15' x 40'; McCutcheon Bros.

Somerset St., s e cor. Reese St., three-st'y store and 5 two-st'y dwells., 18' x 57', and 14' x 41'; Daniel Nevling, contractor.

Islington Lane, w s, bet. Berks St. and Montgomery Ave., 18 two-st'y dwells., 15' x 47'; Jas. Caven, owner.

Main St., s w s, and School Lane, Saving Fund building, 35' x 64'; J. C. Caldwell, contractor.

Cottage Lane, bet. Clarkson Ave. and Thorp's Lane three-st'y dwell., 38' x 57'; J. C. Caldwell, contractor.

Mount Vernon St., e s, n Division St., 4 three-st'y dwells., 17' x 33'; James Hinchliff.

Jefferson St., s e cor. Hamilton St., two-st'y dwell., 17' x 50'; A. A. Harmer, contractor.

Tenth St., s w cor. Wallace St., two-st'y church building, 56' x 120'; Geo. F. Payne & Co., contractors.

Philip St., No. 2325, two-st'y dwell., 18' x 30'; Chas. Walls, owner.

South St., No. 1210, three-st'y store and dwell., 21' x 62'; Grubb Bros., contractors.

Seventeenth St., s w cor. Tasker St., two-st'y store and dwell., 15' x 41'; Wm. Galbraith, contractor.

Ripka Ave., n s, w Washington St., three-st'y dwell., 17' x 32'; W. R. Davis, contractor.

Willington St., s w cor. Montgomery Ave., 5 three-st'y dwells., 15' x 50'; Thos. McCouch, contractor.

Mott St., w s, bet. Wharton and Reed Sts., 10 two-st'y dwells., 15' x 36'; D. Garrison, owner.

Washington St., n e cor. Ripka Ave., three-st'y dwell., 20' x 47'; W. Goodfellow, contractor.

Jefferson St., cor. Division St., two-st'y dwell., 20' x 44'; W. Goodfellow, contractor.

Spring Garden St., s Green Lane, two-st'y dwell., 14' x 36'; W. Goodfellow, contractor.

Broad St., s s, e Pechin St., two-st'y dwell., 20' x 55'; W. Goodfellow, contractor.

Fifth St., e s, n Cumberland St., three-st'y dwell., 16' x 46'; Samuel Mills, owner.

Church St., n e s, w Trenton Railroad, 2 three-st'y dwells., 20' x 60'; Jas. McCartney, contractor.

Coral St., w s, s Dauphin St., two-st'y dwell., 14' x 42'; Harry Brocklehurst, contractor.

Twenty-third St., s e cor. Cherry St., one-st'y shop, 25' x 60'; Samuel Hart, contractor.

Fifth St., e s, s Huntingdon St., two-st'y dwell., 14' x 42'; Frederick Lambrecht.

Oxford St., s s, w Twenty-fifth St., 7 three-st'y dwells., 15' x 52'; J. L. Carre, owner.

South side P. & N. R. R., above Wissahickon St., three-st'y dwell., 21' x 44'; W. H. H. Lawson.

Spruce St., s e cor. Bradford St., three-st'y dwell., 22' x 75'; Jno. McClellan, contractor.

Woodland St., n s, w Thirty-second St., 3 three-st'y dwells., 16' x 58'; Pennock Bros., contractors.

Lancaster Ave., s s, w Thirty-second St., 3 three-st'y dwells., 15' x 42'; Pennock Bros. contractors.

Belgarde St., w s, n Capewell St., two-st'y dwell., 17' x 40'; J. H. Baldt, owner.

C St., No. 2807, two-st'y dwell., 15' x 40'; D. C. Schuler, contractor.

Eighth St., e s, n Columbia Ave., four-st'y dwell., 17' x 72'; J. Culbertson, contractor.

Mascher St., s e s, n Somerset St., two-st'y dwell., 18' x 40'; P. A. Gerhardt, contractor.

Somerset St., s s, e Mascher St., two-st'y dwell., 16' x 22'; P. A. Gerhardt, contractor.

Sixtieth St., cor. Hazel St., two st'y dwell., 16' x 44'; Harry Petit.

Twenty-seventh St., s e cor. Dauphin St., two-st'y factory, 45' x 77'; G. H. Fretz, contractor.

Norris St., s w cor. Belgrade St., 4 two-st'y dwells., one with store, 15' x 47'; Duryea & Childs.

Franklin St., e s, n Church St., one-st'y office 26' x 30', and cylinder-room, 26' x 50'; Wm. Reas, contractor.

Main St., n e cor. Pleasant St., 2 two-st'y dwells., 16' x 40'; Tonrison Bros. contractors.

Sixty-fourth St., e s, s Haverford St., two-st'y dwell. and stable, 18' x 42' and 24' x 24'; Jas. Barlow, owner.

North Ninth St., No. 19, four-st'y store, 20' x 70'; F. Brill, owner.

Gray's Ferry Road, w Forty-eighth St., three-st'y dwell., 17' x 34'; Isaac Wood & Murray, contractors.

Chestnut St., n s, w Thirty-second St., three-st'y dwell., 18' x 60'; Reuben Yarnall, owner.

Carnarvon St., e s, bet. Dickinson and Tasker Sts., 11 two-st'y dwells., 14' x 28'; Jno. White, contractor.

Palethorp St., No. 1331, three-st'y dwell., 14' x 30'; D. C. Schuler, contractor.

Marston St., No. 2102, two-st'y dwell., 18' x 30'; Rudolph Sindel, contractor.

Portland, Oregon.

HOTELS. — Mr. Schade is putting up a hotel-building; cost, $7,000.

Dr. Wilson is having plans prepared for a three-st'y brick building, 100' x 100', with one hundred and thirty rooms, for hotel purposes; probable cost, $35,000.

HOUSES. — John Gates is having a two-st'y house built; cost, $6,500; R. G. Combs, contractor.

Dr. G. Kellogg is building a two-st'y house; day work; W. A. Cordell, Superintendent.

Wm. Sweeney is having built 5 five-roomed cottages, for rent, which will cost $8,000; R. Robertson, contractor. He also intends putting up a two-st'y house, costing $5,000.

E. W. Burden is building a two-st'y house for Charles Hartness; cost, $2,300.

Messrs. Merchant & Bridges are putting up a house for George Houghton; cost, $6,000.

Thos. Stephens has let the contract for a cottage to Sedge & Jenkins, for $2,200.

B. F. Campbell has just been awarded the contract for a house for Mrs. Hawthorne, at $4,680.

STORE. — Plans are being prepared by W. H. Williams for a three-st'y brick store for P. B. Sinnott, 50' x 95'; cost, about $30,000.

John Maher is building a store, with residence above; cost, $2,500.

STABLE. — W. S. Ladd is putting up a fine stable; day's work; M. Merrill, Superintendent; cost, about $12,000.

St. Louis.

BUILDING PERMITS. — Fifty-eight permits have been issued since our last report, of which nineteen are for unimportant frame houses. Of the rest those worth $2,500 and over are as follows: —

Christ. Heinz, 2 adjacent two-st'y brick dwells.; cost, $7,000; Beinke, architect; J. Fischer, contractor.

Jno. McDermott, two-st'y brick tenement; cost, $3,000; Brady, architect; G. Neumeister, contractor.

Carondelet Ave. Furniture Manufacturing Co., two-st'y brick Furniture Manufactory; cost, $6,000; Klute & Hillebrandt, contractors.

W. L. Fitzgerald, two-st'y brick dwell.; cost, $4,000; Brady, architect; J. H. Frye, contractor.

Harry S. Voellinecke, two-st'y brick dwell.; cost, $2,500; Pipe, architect; J. B. Asper, contractor.

H. J. Powers, two-st'y brick store-house; cost, $3,000; sub-let.

Mrs. Mary L. Knower, 3 adjacent two-st'y brick dwells.; cost, $8,000; C. K. Ramsey, architect; E. T. Hoffmann, contractor.

J. T. Cole, two-st'y brick dwell.; cost, $2,500; J. V. Majors, contractor.

South St. Louis R. W. Co., three-st'y car-works; cost, $6,150; Helm Bros., contractors.

McPheeters Warehouse Co., one-st'y iron-clad warehouse; cost, $3,600; Renick, architect; R. P. McClure, contractor.

A. L. Paul, 2 adjacent two-st'y brick dwells.; cost, $10,000; J. A. Conlon, contractor.

P. Neun, 4 adjacent two-st'y brick dwells.; cost, $14,000; Janssen, architect; Beckmeier & Riethmann, contractors.

B. Israel, 4 adjacent two-st'y brick dwells.; cost, $10,000; May, architect; Wm. Herkenhoff & Bro., contractors.

F. Grafmann, one-st'y brick dwell.; cost, $3,100; May, architect; Wm. Herkenhoff & Bro., contractors.

P. Stemmler, two-st'y brick dwell.; cost, $2,900; C. F. May, architect; Jaeger, contractor.

C. Kahn, two-st'y brick dwell.; cost, $5,300; W. C. Popp, contractor.

Washington.

DURING the month of May permits were issued for 123 new buildings, 166 repairs, 100½ feet of vault and 15 awnings. The receipts from permits were $628.

BUILDING PERMITS. — Two-st'y brick dwell., 18' x 56'; on R St. bet. Twelfth and Thirteenth Sts., n w, for Fred Stultz; cost, $3,400.

Four-st'y brick warehouse, 54' x 120', cor. Second and B Sts., n w, for G. W. Knox; cost, $15,000; S. T. G. Morsell, architect.

Three-st'y brick dwell., on Fifteenth St., bet I and K Sts., n w, for Jas. Wormley; cost, $15,000; J. G. Myers, architect; S. P. Philips, builder.

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THE reply of the Supervising Architect of the Treasury Department to the most definite of the accusations made against him has been filed, and contains a simple statement of facts which every one but his assailants knew all about before. From the mass of assertions, more or less wild, which have been made since the investigation began, his counsel succeeded in separating one which showed a semblance of definiteness and common-sense, and requested leave to reply to it by itself, instead of being compelled to beat the air in vain efforts to reach all the phantoms of the accusers' imaginations. The specification selected was that charging the government architect with paying more than the market price for the stone-work of the Philadelphia Post-Office, and was supported by the testimony of a former attaché of the architect's office, who was employed to make measurements and estimates for the purpose, and of a stone-cutter, who compared the wages which he received for doing certain portions of the work with the prices which he asserted to have been paid to the contractors who employed him, and which certainly indicated that they received a handsome profit. To these representations the reply is made that the Government undoubtedly paid a large, even an exorbitant price for the stone-work of the public buildings generally, which were in process of erection at the beginning of the present administration of the architect's office, but it is also asserted, and can be readily shown, that the work for which the exorbitant prices were paid was executed under contracts entered into under a previous administration, which allowed the contractors a still larger profit, and were modified in the interest of economy by the strenuous efforts of the present architect, who, although hampered by the acts of the very one who has until recently been most active against him, succeeded in obtaining a reduction of cost which was probably as large as could have been secured without changing the color of the stone, and the style of cutting, in buildings whose exterior was already about three-fourths done.

THE nature of the saving made by the modification of the Government stone contracts may be surmised by referring to the printed report of the evidence taken in regard to these same contracts some years ago. Under the original agreements, made at the instance of the first Supervising Architect of the Treasury Department, certain dealers were employed to furnish stone, at a given price per cubic foot; and in addition to this, to provide tools and plant, and hire workmen, all of which were to be paid for by the Government, while they were to receive for themselves fifteen per cent on the whole expenditure, as compensation for their trouble. Such contracts as this might not be objectionable in the case of a private proprietor, but as carried out on behalf of the Government they became a mere cover for scandalous robbery of the public treasury. We have heard the story of the contractor in Maine who employed apprentices for a small sum, and charged them to the Government as skilled stone-cutters at the highest rate of wages, appropriating to himself the difference, together with fifteen per cent commission on the amount of his theft; and there were many similar cases. In one instance, the stone supplied by the contractor was of bad quality, being full of spots and stains; but his men were immediately set at work in repairing its deficiencies by neatly chiselling out the spots, and fitting in small patches of the same stone; the Government paying the entire cost of this novel mode of improving the quality of material, while the contractor received fifteen per cent on the cost of renovation for his ingenuity. If we remember rightly, a single stone in the Chicago Custom-House, one of many, is still to be seen adorned with twenty-two patches, as a costly memorial of the advantages (to the contractor) of the percentage system; and so widely distributed, and so rich, were the profits arising from it, that a long struggle was necessary before it could be overthrown. Even now, it is thought that the attack upon the Government architect may have as one of its objects the restoration of this system, and the suggestion derives some color from the fact that it was at first most energetically pressed by the person originally instrumental in its adoption. If there is anything more than plausibility in the idea, it is fortunate that the attack is not likely to succeed.

AS many of our readers know, the laws of New York regulate very strictly the arrangement of tenement-houses, and prescribe the exact proportion of the lots on which such buildings stand which may be covered by the structure, without diminishing too much the space to be reserved for light and air. It has become so common of late, however, to build tenement-houses of great height, that a modification of the old rules seems desirable, and with the usual wise caution of the New York Board of Health, a circular, presenting the rules in relation to the matter which the Board has now under favorable consideration, was recently sent to the architects and builders of the city for their consideration and criticism. The proposed rules are very simple, and provide merely that tenement or apartment-houses not more than five stories in height may cover seventy-eight per cent of the lot; while those six stories in height must not cover more than seventy-five per cent; seven-story buildings not more than seventy per cent; and those of eight or more stories not over sixty-five per cent. In the case of corner lots, which are of course excepted from the operation of these rules, the only restriction is that where the buildings erected upon them are more than eight stories high, a clear, open space ten feet in width must be left at the rear of the lot. The object of this is of course to provide for a circulation of air through the interior of the blocks, the importance of which seems to be more fully appreciated in New York than elsewhere. One can hardly help wishing that the Board might have the courage to carry the same principle one step farther, and prohibit the introduction, in buildings of this class, of any enclosed shaft whatever; compelling owners to light all bathrooms and inferior offices, if not directly from the outside, at least from shafts open to the exterior at the top and bottom, so as to be continually swept by a current of fresh air. Some of the best of the recent apartment-houses have been already so arranged, but in others, perhaps the loftiest and most costly ones, bathrooms, pantries, and even chambers are planned to open upon wells, closed at the foot, and containing an almost stagnant column of air, which, as soon as the building is fully occupied, is poisoned by the fumes from six or eight, or even in the new ten or twelve-story structures, from twenty or thirty superposed kitchens, slop-sinks and water-closets. The ventilators usually put in the skylights at the top of such shafts do little to improve the condition of the air in them, and nothing short of openings at each end, large enough to secure the rapid movement of the whole of the included atmosphere, can make them even tolerably safe outlets, to say nothing of inlets, for the air of sleeping rooms. In Paris, where interior courts, although much used, are generally larger and more open than with us, the unwholesomeness of the air contained in them is just now attracting serious attention, and their construction will probably be regulated before long by stringent laws, and if Paris, which has no very high reputation for healthfulness to maintain, finds it necessary to modify the present system by force in favor of the poorer classes, the officials of New York, in which vast apartment-houses are as yet intended mainly for those who can

well afford to pay for the preservation of their health, should certainly not fail to seize the opportunity for compelling now the adoption in such buildings of a high standard, the value of which will be felt for generations hence by all portions of the community.

THE prospects of the Boston Foreign Exhibition seem to brighten as the time for it approaches. So many applications for space have been received that it has been found necessary to add about one-fourth to the available area of the great building of the Massachusetts Charitable Mechanic Association by constructing a temporary extension, two hundred feet or more in length. This extension, although intended only for a few months' use, is to be built entirely of fire-proof materials, and devoted to the exhibits of fine arts, leaving the main building, which, although very substantial, is not fire-proof, for the displays of miscellaneous articles. The French Government seems to have courteously interested itself in the exhibition, and specimens of the Gobelins tapestry and porcelain from Sèvres will be shown, as well as some pictures from the galleries of the Luxembourg. Italy, as was originally announced, will send a large and interesting collection, secured in a great degree through the efforts of Mr. James Jackson Jarves. Among the minor features of the exhibition will be a number of characteristic restaurants of various countries. In the Persian department, which is to be one of the largest and most interesting of all, will be an Arab tent, where Mocha coffee will be served by Arab waiters. The Japanese exhibit will comprise a tea-house, with Japanese women as waiters; and German and French restaurants, as well as an English chop-house, will be attached to their respective departments.

A PRESSING, and as we hope, convincing appeal has been made by certain New York members of the Archæological Institute of America to the enlightened citizens of that place for aid in raising funds for the prosecution of the explorations in classical countries so auspiciously begun at Assos. The total cost of such work as that which was carried out with so much intelligence and success by the Assos expedition has been and will probably be for the future, only about sixty-five hundred dollars a year, and important as the results of the first expedition have been to the learned, it is probable that in many places discoveries are awaiting the energetic explorer which would appeal more strongly to the imagination than any yet announced. It is by no means decided where operations will be commenced, in case the money is raised, but the ruins of Cyrene in Africa, Sybaris in Italy, and several towns in Crete, are suggested. Of these Cyrene would be on some accounts the most available, the site being elevated and salubrious, while many remains of temples and other buildings, and countless tombs are still visible above ground. It would, however, having been continuously occupied and plundered by Persians, Egyptians, Greeks, Romans, Saracens and Arabs to our own day, lack something of the romantic interest which attaches to the name of Sybaris, the city whose wealth and luxury has been a proverb for nearly thirty centuries, and which, at the height of its prosperity, was taken by its enemies and buried, by turning the course of the river Crathis through it, in the mud which has lain undisturbed upon it for twenty-four hundred years. Unfortunately, the marsh under which Sybaris lies entombed is of the most malarious character, and the fevers of southern Italy are not to be rashly braved, even for the sake of disinterring a city, so that if the task is undertaken, it must necessarily be pursued with great caution.

A CIRCULAR sent out by the American Society of Civil Engineers calls attention to the fact that the National Exposition of Railway Appliances at Chicago contains a large number of specimens of wood, treated with various preservative applications, and collected by the committee of the Society appointed about four years ago to report upon the preservation of timber. The committee has not yet finished its labors, but it is expected that the final report will be made this year, and in view of the great and increasing importance of the subject this will be awaited with much interest. Of the processes in commercial use for timber preservation the three principal ones are those called kyanizing, which consists in impregnating it with bichloride of mercury; burnettizing, in which chloride of zinc is used instead of the mercurial salt; and creosoting, in which the oil of creosote obtained from tar is the antiseptic agent. The cheapest of the three processes is the burnettizing, which adds about five dollars per thousand feet, board measure, to the cost of the lumber, and may be depended upon at least to double its durability, in dry situations. The results of kyanizing are very similar to those of the other process, but the cost is about one-fifth greater. Creosoting, which the committee regards as the most effective process of the three, costs in this country from twelve to twenty dollars per thousand feet of lumber. It is thus almost too expensive for ordinary work, but serves well for piles and bridge timbers exposed to the attacks of the teredo, which will not touch the creosoted wood, although it attacks timbers treated by either of the other processes.

THE *Chronique Industrielle* mentions what it calls the "new invention" of M. H. J. Piron, for preventing the rotting of fabrics of linen and cotton by tanning them. According to the account, M. Piron was struck by the circumstance that the linen bandages wrapped around the heads of Egyptian mummies, which show no signs of mildew or decay, are found to be impregnated with some vegetable resin; and following this indication, investigated the properties of a considerable number of tarry and resinous matters, and found the substance which is extracted from birch bark for tanning Russia leather to be the best suited for the preservation of vegetable fibres, although others may be used. Whether M. Piron has patented his process we are not told, but it was certainly quite unnecessary for him to go back to the ancient Egyptians for examples of a mode of treating linen and cotton which is in common use among the sea-faring population of all civilized countries. One can hardly cross the English Channel, or glance at the shipping in any Mediterranean port, without seeing, amid the white canvas of larger vessels, the picturesque reddish sails of fishing boats and lighters, whose owners, in pursuit of durability rather than appearance, have put them to soak, when opportunity offered, in their neighbor's tan-pits. Even in this country tanned sails, though exceptional, are by no means unknown, and more of them would probably be used if their merits were better understood.

THE *Building News* calls attention to the number of fires which occur from "defective flues," and urges the necessity for better construction of chimneys. It thinks that terra-cotta flue-linings form, on the whole, the best safeguard against fire that we have, and suggests that where these cannot be used the flues should be well pargeted inside to prevent the escape of sparks, and that in all cases chimneys should be built with eight-inch walls to a height of at least six feet above the highest fireplace opening into them. This is a subject which needs quite as much attention in this country as in England, and nothing would please us more than to see the managers of the insurance companies, who practically control all such matters, undertake an active crusade against a particular item of bad building which must cost them, in this country, something like a hundred thousand dollars a day. The art of building safe chimneys is a very simple one. Make them thick enough not to heat through, and steady enough to stand alone, and keep every sort of wood-work at least one clear inch away from them, and all danger from "defective flues" will be averted. The substitution of terra-cotta pipe-linings for an extra four inches of brickwork is permissible in some cases, but is not to be depended upon for protection, and the terra-cotta in the form usually employed adds nothing to the stability of the chimney, which is as important as the thickness of its walls. The pargeting of the flues, which the *Building News* thinks desirable, is a very doubtful expedient. After some years of use the coating of mortar on the inside of the chimney, unless made with a large proportion of cement, often cracks and scales off, bringing with it in its fall a considerable part of the mortar in the joints, which are thus left more exposed to the passage of sparks through them than if they had been simply struck flush in the first place. As a general rule, a cheap chimney may be taken as a dangerous one; the brick and mortar needed to enclose the fire beyond the possibility of escape, and to prevent the necessity for steadying the stack by bringing it in contact with the beams, cost a good deal of money, and until those who build to sell are compelled in some way to use the precautions which they probably know about, but do not see fit to employ, those who buy and live in new houses must not be surprised to have them occasionally burnt down over their heads by means of "defective flues."

THE COMPETITION FOR A MECHANIC'S HOUSE.

REPORT OF THE JURY.

TO a mechanic the most important point would be the plan, and in this the following would be the conspicuous points to consider:

1. One chimney for economy.
2. Convenient access to the same from several rooms.
3. As small a hall and as large rooms as possible.
4. Possibility of air currents through the rooms in summer.
5. Simple exterior, and square plan with few breaks.
6. As much attractiveness inside and outside as is consistent with the above.

"*Minimum*" (first prize) covers on the whole more of these points than the other designs. Plan is thoroughly studied. Parlor and one bedroom have no access to the chimney, but on the other hand each room is entered from the hall, and there is no waste space in either story. The *outside* might be more interesting, but the whole sheet is thoroughly well drawn. The author of the scheme should give his tenant a chance to warm his parlor.

"*Sweete Simplicite*" (second prize). Plan compact but not as closely studied in detail as "*Minimum's*," since there is more waste space in halls. The stairs require more expensive finish, while in "*Minimum's*" design these, though simple, would be attractive. One chimney reaches all but one room, which is a very good point. The stairs cut badly into the kitchen, although this fact is not emphasized in the drawing. The outside is attractive and simple, and the drawing is excellent.

"*Broome Street*" (third prize). This plan is larger than the two just named, and is less well arranged, as the first story extends beyond the second in the rear, the second beyond the first in front, and the partitions are somewhat scattered. The rooms are, however, well arranged around the chimney, and the house is attractive inside and outside, and has a better exterior grouping than either "*Minimum*" or "*Sweete Simplicite*." The specifications are full, and the recommendations for future expenditure, as the owner grows more wealthy, seem as if they might be needed. The drawing is good, but lacks the dash of the two preceding sketches.

"*Cassius*" and "*Peregrine White*." These two sketches are so much in the same spirit that the same remarks apply to both. They have a much better feeling in the design of the exterior than any of the other drawings, but it is fair to say that this is gained by a plan that gives small rooms and a long hall, and which makes two chimneys necessary. Although a long and low exterior is thus gained, the plans are not such as would be most useful to a mechanic. The front door in "*Cassius's*" design seems oddly placed, possibly by reason of the effect added to the outside by the porch roof at the end of the group. "*Peregrine White's*" drawing is simple and choice, and the finish of the eaves is knowing and good. Both drawings seem to have been mainly made with a view to an attractive exterior, and in this both are successful.

"*Country*." Very good plan indeed; good enough for a better class of house. Good mantel. Fair exterior, but not especially attractive; not nearly up to the level of the plan.

"*Utile dulce*." The plan in the first story seems complicated; alcoves four feet wide are not useful. While a lodge on a country estate might well have rooms in the roof, so that the building might be low and picturesque, a mechanic building his own house would wish as good and clear second-story rooms as possible. This plan also requires two chimneys. The cottage is, however, picturesque and the drawing remarkably good.

"*Caboul*." Plan about as good as any offered. The hall and back doors well arranged; chimney not available for two of the rooms. The outside has some good ideas of detail, but the drawing hardly does it justice. With so good a start as "*Caboul*" is making, he ought to sketch more, so as to draw more freely and with more accuracy and dash. Such surrounding foliage and lettering prevent a good design from appearing at its real value.

"*Vulcan*." Too late for competition. Plan rather crowded at the entrance, and staircase cuts into the lower room over the fireplace, although the view up the stairs from the hall might be pretty. Chimney not well placed for the chambers. The exterior very carefully drawn, but not with the touch of a person who is used to sketching. The grouping is pleasing. There ought to have been an allowance in the full specification for flashing a large cricket behind the chimney that blocks the valley.

"*XXX*." Good plan. Fair exterior, but poorly drawn in perspective. The gable out of drawing, and the surroundings do not improve the sketch. The details indicate greater familiarity with practical than with artistic work.

"*Euchre*." Stairway poorly arranged; central chimney good. Details nicely drawn and perspective prettily rendered.

"*Engineer*." Plan too small. Although it may suit the sum to be expended, a family would be very uncomfortable in such small rooms. The outside too complicated. Drawings carefully made, but lacking in artistic touch or feeling.

"*Box*." Plan compact, but not interesting, although the start is a good one. The arrangement of the outside is satisfactory, but all the drawing is hard and mechanical, and the author should practise drawing foliage in private until he can succeed better than in this drawing. Practice in drawing from nature or good copies will alone give him a good, firm and free touch.

"*B. D.*" Simple but commonplace plan; excellent exterior. A very neat sheet of drawings.

"*Check*." Good plan, fair exterior, hard and mechanical drawings. Better give up using the drawing-pen so much in perspective, and cultivate free-hand drawing; cross-hatching with the drawing-pen is particularly expressionless.

"*St. Joseph*." Too much hall, and chimneys ill arranged. Outside has too many breaks and porches for looks, or for a mechanic to invest in. Details ordinary.

"*Ventilation*." Too late for competition. Plan quite good. This design is the only one offered for a brick house. It is uninteresting in itself, and the perspective does not make it more interesting; on the contrary, it looks thin, and the window reveals are not shown in it.

"*Clipper*." Fair plan; no fire in front rooms; very neat drawings; attractive stair-newel, etc. The elevation chosen is high and awkward; the building looks better in the perspective.

"*Red-Head*." Compact plan, but perspective rendered in a hard and mechanical manner, and not well designed. The details also look mechanical.

"*Commodité*." Too late for competition. Stairs poorly placed. Plan unusual, without any corresponding gain. Detail and outside commonplace. Perspective muddy, and while the surroundings are elaborate, they are poorly drawn; a workmanlike set of drawings requires better lettering.

"*A Flat*." Good plan. The rendering of the perspective gives promise of future delicacy and success. The slope of porch-roof takes the lines out of the picture, and injures the group, and the windows could be better studied.

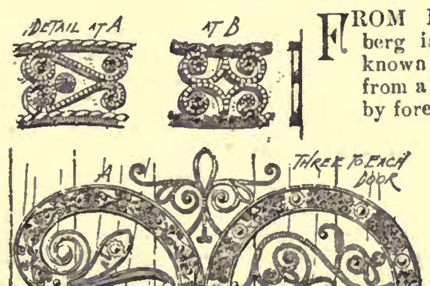
"*Tuscan*." Plan awkward as to start of stairs. Outside of an ordinary type, and the drawing shows too little feeling for detail, and too much readiness to use ordinary mill-work. The lettering, etc., are not worthy of good drawings.

"*Welcome*." Stairs out of the sitting-room not good, as draughts come down them. Better have stairs go out of hall; also better omit surroundings unless well drawn. The detail looks like ordinary mill-work instead of carefully designed detail. Better to have very little of the latter than much of the former.

H. W. HARTWELL, Chairman.
ROBERT S. PEABODY,
F. W. CHANDLER.

[THE design prepared by "*Thumb-Tack*" was received so late that it was not even submitted to the jury. It will, however, be published.—EDS. AMERICAN ARCHITECT.]

FROM BAYREUTH TO RATISBON.—NOTES OF A HASTY TRIP.—VIII.



FROM Rothenburg to Nuremberg is from the almost unknown to the thrice-familiar, from a town as yet untouched by foreign travel to one which the hastiest tourist in Germany cannot leave unvisited — one which has been so often described — and in these columns as well as others — that I should have small excuse did I stop to detail its attractions for the hundredth time. Every student of architecture knows what he will find there, and it is safe to say that he will be more than satisfied when his turn comes for actual inspection. Revisiting it after a lapse of ten years I found that in spite of the immense strides the city had made in the interval, its old beauty remained unaltered. New quarters had grown up, the streets were much fuller and more busy than before, the shops more numerous and far finer. Instead of lodging in a crumbling, odoriferous, musty inn overhanging the river, the traveller may now be accommodated in hotels as spacious and luxurious as any to be found in Europe, situated in wide and airy streets; but all these changes have made Nuremberg more, rather than less, interesting. They are, indeed, es-

pecially instructive and delightful as showing that new things may be combined with old in a way that injures the effect of neither. There was a great outcry some years ago over the commercial growth of the city and the supposed intention of the municipality to remove the old walls in order to give room for its expansion; but the most rabid of antiquarians must allow that a living commonwealth has other needs and other duties besides those of acting as the conservator of the relics of bygone days, and if every commonwealth attacked the problem of how to reconcile its different obligations with as much intelligence and skill as these Nurembergers have shown, the art-lover would have little cause for lamentation. In no place of which I know — certainly in no place where a sudden revival of commerce and industry has called for extensive changes—has there been shown so much loving and at the same time sensible appreciation of the value of ancient relics as in Nuremberg. Parts of the walls were taken down of absolute necessity, in order to give access to the growing suburbs; but not one stone more than was requisite was disturbed, and the damage would hardly be noted by a visitor. All through the town the old buildings have been carefully preserved, the new growing up beyond and around them; and the effect is more harmonious than could be imagined from a knowledge of how such amalgamation has resulted in most other places. While not adhering slavishly to old models the recent builder has succeeded in making his structures seem as though they were the natural modern successors of their older neighbors, and not upstart aliens which might have grown on any soil. Where restorations were necessary they have been made with such skill that no one who sees the famous *Schoene Brunnen*, for example, would imagine how great a part of it is due to the hands of recent workmen, copying with pious care the crumbling stones set by their far-off ancestors. To-day Nuremberg holds a place second to no German city, scarcely, in its commercial energy, and is especially noted as the home of many of the art-industries which have enriched Bavaria during the last dozen years; but it should be noted also as the city of all Europe where the most loving and intelligent care is taken of the rich treasures of the past. If Rothenburg is unique as an almost untouched picture of days long gone by, Nuremberg is equally unique, I must repeat, in showing how to-day and yesterday may dwell together in harmony and beauty.

One of the most striking facts about Nuremberg — one which must impress itself at least unconsciously upon the mind of every visitor — is the degree to which the town is pervaded by the memory and the influence of one man. Varied as is the history of the place, vivid as are its annals both in politics and in art, crowded though they are with striking and impressive names, there is one story, one name beside which all else takes the secondary rank in our interest and imagination. There are many places filled with the aroma of a single name—as Parma with Correggio's, as Orvieto with Signorelli's—but they present far less of interest in other directions than does Nuremberg; the single figure stands out against a background less vivid, less well-known, less crowded with mighty shapes. But Nuremberg with all its other memories, all its thousand attractions of every sort, all its names of high rank in many branches, is first of all to-day the shrine of Albert Dürer. It is as his home that it appeals most strongly to our hearts — it is his life, his steps, his traces that we seek first and with the most of eagerness. The whole city seems to belong to him, to be part and parcel of his work and fame. Kaisers and truculent burghers, architects, sculptors, other painters, are all forgotten for the moment when we first see Albert Dürer's home, and the longer we stay the more his memory seems to pervade the place. We follow up a hundred other threads of interest and throw ourselves into the history of many other periods; but we come back to him and his as to the main centre round which all else but clusters. We can imagine Nuremberg without Adam Krafft or Peter Vischer; without its Lorenzkirche, even without its citadel. But without Albert Dürer it would not be Nuremberg at all. He is one of the few artists of whose life and labor we know almost as much as of their artistic outcome; but this fact would not make him so vitally present to our minds were his not a personality of such singular charm. It is something more than admiration; it is affection we feel for the man and for the artist. No man was ever more identified with the life of his native place, no artist ever a more patriotic citizen; and it is his just reward that he is perpetuated to-day in Nuremberg as perhaps no other artist is in any other place, for it is only the *work* of a Correggio or Signorelli we seek in the places where they labored — but it is the memory of the man himself we seek and find in Nuremberg. Everything speaks of him — his pictures, the church where he worshipped, the streets where he walked, the *Kneipe* where he drank, the walls he built, the graveyard where he lies buried, the tombstone with its famous "*Emigravit.*" Truly did Longfellow say of him — though the lines are almost too trite to quote: —

> "Fairer seems the ancient city and the sunshine seems more fair,
> That he once has trod its pavement, that he once has breathed its air."

He worked and planned for his city in life, and his city is his monument to-day. The walls of the town are perhaps the most beautiful in existence, but it was not this fact which raised such a lament when it was rumored they were to be destroyed — it was, to every lover of art, to every lover of Nuremberg, the fact that Albert Dürer had had a hand in their erection. Is it not a proof that art brings the truest immortality, this fact that Dürer's memory reigns in Nuremberg to-day not only above every other there, but more dominantly, I think, than the memory of any man of his time lives in any place?

There is one other personality which is very living and very fascinating to some of us in Nuremberg to-day, though for different reasons, — for those of an extrinsic rather than of an intrinsic sort. We do not care greatly for Hans Sachs as history, still less as literature, reveals him to us; but Wagner's *Meistersinger* has thrown a halo of interest about his figure which makes him very vivid to us in the streets of Nuremberg. I am sorry for him who goes to Nuremberg without knowing this drama. He might as well go without ever having heard the name of Dürer. Nay, better, for he would soon learn of Dürer when once upon his native soil, but would always miss the delight of those to whom Wagner's Sachs is such a living and lovable figure. And it is not only Sachs himself but all the temper, all the life, all the picturesqueness of his time and his city we are shown, with such truth and clearness that we can reconstruct their image for ourselves from the rich fragments which remain and from Wagner's poetry. And here we have another witness to the potency of art — for art has done for us what all the prose and all the history in the world could not — has absolutely revivified the past, clothed its dead bones with life, and made it as clear and as present to our minds as the present all about us. Not a few of us, I am sure, owe our first interest in the name of Nuremberg more to Longfellow's little poem than to all the histories and biographies we ever read; and those of us to whom Wagner has sung of Sachs's city, and to whom he has shown its former shape, care more for and learn more from the creatures half or wholly of his imagination, than for the dim and bloodless shapes we read of in the historian's chronicle. I heard some one say once that in the last generation people went to the Wartburg for the sake of Luther but that now they go for the sake of Tannhäuser. If so, and I do not doubt the truth of the epigram, the change is probably not owing so much to the less devout temper of our day as to the fact that in the interval Wagner's art has irradiated this place too.

A few years ago Dürer's former home was bought by the city and restored as nearly as possible to its condition in his time. It is a tall half-timbered structure with an immense overhanging roof standing on a street corner just under the shadow of the city wall — which, however, was not built when he was painting, so that the gloomy studio on the ground floor was then much better lighted. Upstairs we see the rooms in which he lived and worked, low-ceiled quaint little apartments with square windows filled with tiny panes of glass. A good collection of reproductions of his engravings and drawings is displayed in them, and altogether, whether or no we believe every tale as to this and that article having been used by him, his home is the most satisfactory of any similar abode I yet have seen. It is probably almost exactly as it was in his time — and it is certainly just exactly as we feel it should have been. Another place which no visitor should omit to see is the tiny little *Wirthschaft* where the artists of Nuremberg used to congregate at night. It stands almost free near the corner of one of the most picturesque squares of the town, and bears the name of the *Bratwürst glöcklein* — which, being literally translated means "little fried-sausage bell." Such was the title of an æsthetic café in Dürer's time when affectation could certainly not have been a badge of art! At the corner of the low little building projects an elaborate wrought-iron arm holding a bell — whether the original signboard or a later imitation it is of course not possible to discover. Within it is the tiniest of places, just room for a narrow long table and its rows of stools, everything in it being of the most picturesque antique appearance. Relics of former great men hang all about, and on a shelf above the door are great beer mugs labelled with famous names, which are sworn to as having been the actual private drinking vessels of a Dürer, a Krafft, a Vischer and a Baumgartner. Fortunately the room is not a mere show-place but is still in use — daily crowded with fat burghers taking their evening meal or their hourly beer; so it is all the easier to imagine its appearance in the glorious sixteenth century.

As I premised, I have no idea of telling once again the story of Nuremberg's architectural attractions. I will only say that no church in Europe is from a pictorial point of view more entirely delightful and satisfactory than the Lorenzkirche. If its interior has ever been renovated it does not show the traces of modern hands; and time has touched it with the most caressing finger, obliterating no slightest detail, removing nothing, altering nothing, only adding a richer color and a mellower tone. The light in the church, especially toward sunset, is marvellously beautiful. Such an atmosphere of golden mist falling on such an accumulation of softly colored, dusky treasures I remember in no other church. One does not want to criticise or to examine, but day after day, no matter what else of interest is on hand, one is tempted to end one's task by turning in again to the Lorenzkirche and sitting idly for an hour to drink in its beauty. Architecturally, the church is of course, most interesting — especially so as showing how good an effect was sometimes produced by the juxtaposition of two quite different styles of building. The main portion of the structure has a nave and aisles, but the choir — very large in proportion — was built in the fifteenth century after the *Hallenkirche* plan, the roof of equal height throughout and the divisions only marked by tall slender shafts rising to the intricacies of the vaulting. The vaulting itself is as curious and as beautiful as any I have seen. A narrow winding staircase in the wall brings one to a gallery with a fine open balustrade which runs around the

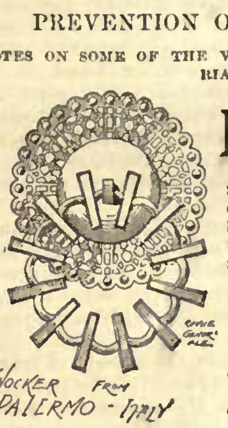
choir at a great height. From this a marvellous perspective of the nave is obtained and the entire beauty of the church first recognized. Here too we come close to the upper portion of Adam Krafft's famous pyx which curves its head under the ceiling like a slender fern. And it is well worth examining thus near at hand, even though we find that the stone has been covered with a coat of paint. This must have been done some time ago, however, for the color has toned down again so that one does not realize the fact save upon close inspection.

It is hard to say which is more interesting; the building itself or the countless odd and curious relics with which it is crowded — the great carved chairs labelled with the names of the guilds wherein, until just a few years back, the guildmasters sat on certain occasions to receive alms for the poor of their corporations; the quaint wood carvings of Veit Stoss and his pupils which rest against the wall or are suspended in mid-air from the ceiling; the coats-of-arms which in one place cover a large extent of wall, hung there in memory of families which have become extinct. Beautiful as are the other churches of the city, their attractions are less to every one, I think, than those of this wonderfully impressive and pictorial Lorenzkirche. Fortunately one can obtain what is rarely to be had of any church — a good large photograph of the interior, taken from a high point of view which, while it does not, of course, reveal the church to those who have never seen it, yet recalls its chief charm to those who have,— the glory of misty light which fills its rich interior.

M. G. van Rensselaer.

PREVENTION OF FIRES.[1] — II. [APPENDIX.]

NOTES ON SOME OF THE VARIOUS AGENTS EMPLOYED TO RENDER MATERIALS UNINFLAMMABLE.



In March, 1855, M. Salomon, of Paris, submitted to the Board of Ordnance a method of rendering wood and canvas incombustible by treatment with soluble glass or silicate of potash. The same materials, employed in a different manner, had been suggested by Mr. (now Sir Frederick) Abel to render huts in the Crimea fire-proof. M. Salomon's plan of mixing and applying the silicate was open to question, but the subject was of such importance that Mr. Abel recommended to the Board of Ordnance the undertaking of experiments without delay, in which he proffered his assistance.

In August, 1855, Mr. Abel reported farther on M. Salomon's process. Experiments were made with fire-proof liquids of the following composition: —

First Bath.	Kilos.	Second Bath.	Kilos.
Acid sulphate of alumina	30	Dried chloride of calcium	20
Gelatine (glue)	10	Gelatine (glue)	10
Water	60	Water	70

Glue having been dissolved by warmth, the salts were added. On the liquids being mixed, a mutual decomposition of the sulphate of alumina and chloride took place, forming sulphate of lime and chloride of aluminum, a soluble deliquescent body possessing the property, like other saline compounds, of precipitating gelatine from its aqueous solution, and converting it into an insoluble substance like leather. It was M. Salomon's intention to fill up the pores of the material treated with an insoluble substance unalterable by heat, and to produce a hard binding material on the surface with the precipitated gelatine. Some difficulty was found in preparing the first bath, owing to the tendency of the gelatine to separate, but the second bath gave no difficulty. Some dry timber was selected, and a portion treated as suggested by M. Salomon, viz., by immersion first in the sulphate of alumina bath, and secondly, after drying, in the calcium bath, while another portion of the timber was treated in reverse order. Twenty-four hours was the time of immersion. Placed upon a charcoal fire beside unprepared wood, those treated by the Salomon process were slower to ignite, and, when withdrawn from the fire, did not smoulder so long. But when thoroughly ignited, the preparation was of no avail.

Canvas treated by the Salomon process was very difficult of ignition, but it was rendered rigid and harsh by the treatment.

In September, 1855, Mr. Abel reports on other methods for rendering wood, etc., fire-proof. He enumerates Maugham's process, which consists in saturating dried wood with phosphate of soda and muriate or sulphate of ammonia, in certain proportions; that of Lieutenant Jackson, by which wood is impregnated with a solution of salts of zinc and of ammonia. These processes, although they do, to a certain extent, diminish inflammability, are not cheap or effective. Silicate of soda, on the other hand, offers many advantages, among these being that wood is easily coated, and that the coating is not deliquescent. Wood was soaked in a weak solution and dried, and then placed on a fire with unprepared wood, when the protective character of the silicate was fully established. A hut, built in the Marshes at Woolwich, was coated with silicate inside and out in one part, and another part with a mixture of lime and alum, when the protective character of the former was again demonstrated. After the hut had been burned, an examination of the charred planks proved that where the silicate had been applied, the fire had not completely penetrated.

Also, in September, 1855, Mr. Abel states that by combining lime with silicate of soda, he produced a fire-protective for application to wood, which resists the action of water as well. The fire-proof nature of the mixture is superior to silicate alone.

In March, 1856, detailing the results of practical trials with silicate and lime, Mr. Abel establishes the effective character of the mixture. A circular of printed instructions was afterward issued, and a paper was prepared on the subject, and printed in the "*Aide Memoire*" of the Royal Engineers, for 1856. The process was afterwards applied, to some extent, to camp-huts at Aldershot, and silicate of soda alone was tried on the wood-work in the interior of the huts.

In August, 1857, Mr. Abel explains that the fifteen tons of material, forwarded to China, is not for experiment, but for use in coating wooden structures on that station; recommending also its employment in India, and explaining how it could be applied to thatched buildings. (The recommendation to send the silicate and lime mixture to China is explained to Sir B. Hawes, March 18, 1857).

In July, 1859, Mr. Abel reports upon sail-cloth, supposed to be rendered uninflammable by a process applied by Messrs. Versmann and Oppenheim (see printed memorandum).

In July, 1859, Mr. Abel states that canvas and other fabrics may be rendered fire-proof, or rather protected from fire, if the alkaline silicates are employed in a peculiar way, with other agents, and suggesting that application be made of this discovery.

In January, 1860, Mr. Abel submitted to the Ordnance Select Committee samples of fabrics rendered fire-proof. Several saline bodies had been suggested for the purpose, but these were none of them trustworthy; in the canvas submitted, a material of a protective character had been fixed within the fibre of the fabric, a double lead and sodium silicate.

In March, 1861, Mr. Abel gave directions for trial of protected canvas made into tents, but reminded the committee that, obviously, nothing will prevent the fabric from charring, if great heat is at hand. The trial recommended was to ignite shavings in contact with the canvas.

In July, 1861, Mr. Abel reported that experiments had been made by him with clothing of men at the Royal Gunpowder Works, Waltham Abbey, and recommended in lieu of ordinary clothing treated with protective material — which glows, on burning — the wearing of woolen fabric. The material called "lasting" was recommended, and was adopted throughout the powder works at Waltham Abbey in 1861, and afterwards in other powder works. Its use was made compulsory in all manufactories of explosives by the Explosive Act, 1875.

In December, 1870, Mr. Abel recommended, as protective coating for the interior of buildings in which manufacture of powder is going on, a material combining the qualities of the silicate of soda and lime coating, as already proposed by him for camp-huts, with certain other qualities, such as its non-liability to retain dust-particles, and non-injury from washing. Mr. Abel suggests—(*a*) equal parts of whiting and zinc (by weight), mixed and ground together; (*b*) equal parts (by measure) of water and syrupy silicate of soda; (*c*) the mixed liquid to be stirred up with the whiting and zinc, and then applied like ordinary paint.

In July, 1871, Mr. Abel recommended the foregoing and also Torbay paint mixed with silicate. Also recommended, as before, the silicate and lime, for out-door work.

In February, 1872, Mr. Abel again called attention to the qualities of these protective coatings for indoor and out-door coatings.

In May, 1872, Mr. Abel recommended chloride of calcium for rope mantelets, so as to keep them damp, and prevent ignition by the firing of the guns. This recommendation was adopted, with very successful results.

In March, 1881, Mr. Abel stated that tungstate of soda (first proposed by Versmann and Oppenheim as a protective for fabrics, see printed report to British Association, 1854) may be applied to wood and fabrics as a protection from fire; but believes it has no advantage for the first-named purpose over the soluble silicate material proposed twenty-five years previously.

In July, 1881, Mr. Abel reported on a fire-extinguishing liquid, submitted as consisting of a strong solution of common salt and soluble glass and stated that it presents little novelty.

Chemist, W. D. To Under Secretary of State for War, July 20, 1859.

The specimen of prepared sail-cloth, submitted by Messrs. Versmann and Oppenheim, has been most effectively deprived of inflammability by the treatment to which it has been subjected. When exposed to the action of a powerful heat or flame, inflammable vapor is evolved, which ceases to burn directly the canvas is removed from the source of heat, and the charred portions of the material cease even to burn in a short space of time.

The protecting agent is so firmly fixed in the canvas that it is not removed at all by friction or repeated washing. The protection afforded to the fabric may, therefore, be considered very permanent.

The only objections of importance which can be raised against the very efficient method of Messrs. Versmann and Oppenheim, of protecting canvas from fire, are: —

1. The great increase in weight which the fabric suffers, and which amounts to nearly fifty per cent of the original weight of the canvas.
2. The comparative costliness of the protective agents employed.

The first of these objections is, to a great extent, inseparable from the efficient permanent protection of canvas and other fabrics from fire; as, in order to attain that result, it is necessary to impregnate the fabric completely with some material which will remain in it as an insoluble solid. I have reason to believe, however, that canvas may be thoroughly and permanently protected from fire, without suffering so great an increase in weight as that resulting from Messrs. Versmann and Oppenheim's method of treatment.

The agents employed by these gentlemen for the preparation of the canvas are compounds of tin, one of the most expensive metals of commerce. The cost of an important process like that referred to can only be looked upon as a serious objection to its employment, when its object may be attained as effectively and permanently by a much cheaper method.

The process of protecting canvas from fire, to which I have called attention in a letter of this day's date, possesses the very important advantage of comparative cheapness over the process of Messrs. Versmann and Oppenheim.

I therefore beg to suggest that the protection of canvas from fire by the agency of silicates, as proposed by me, be made the subject of experiment in the first instance, and that the comparatively expensive process of Messrs. Versmann and Oppenheim be practically tested, should the silicates not fulfil my statement of their efficiency as protectives of permanent character. . . . . (Signed) F. A. Abel.

The Comparative Value of certain Salts for Rendering Fibrous Substances Non-inflammable.

At the meeting of the British Association at Aberdeen, in 1859, a communication on the above subject was read by Mr. Versmann and Dr. Oppenheim. The paper commenced with a consideration of the difference between animal and vegetable fibre; the first containing about eighteen per cent of nitrogen, and the latter consisting exclusively of carbon, hydrogen and oxygen. Animal fibre chars, but is not inflammable, whereas vegetable fibre is. The first idea would be to introduce nitrogen into vegetable fibre by way of a protection, in some such form as glue or albumen. This could not practically be done, though the addition, by means of urea, of thirteen parts of nitrogen to one hundred parts of muslin, did render it non-inflammable. As early as 1735, a patent had been granted to Obadiah Wild, who applied a mixture of alum, borax, and vitriol to paper pulp. It is believed that paper made of this pulp was used for making cartridges. In the early part of the century the attention of many chemists was directed to the subject. Gay-Lussac, in 1830, proposed the carbonates of potash and soda.

[1] From the Journal of the *Society of Arts.*

Fuchs suggested water-glass. The writers of the paper then proceeded to give an account of their own experiments. They commenced trying as many as forty different salts, and those salts which seemed preferable on account of the small amount required, were afterwards tested on a large scale in muslin manufactories or in laundries. Accounts are given of the behavior of the following re-agents: Chloride of potassium and sodium, carbonates of potash and soda, hydrate of soda, bicarbonate of soda, borax, phosphate of soda, sulphate of soda, bisulphate of soda, sulphite of soda, silicate of soda (water-glass), stannate of soda, tungstate of soda, cyanide of potassium, carbonate of ammonia, oxalate of ammonia, biborate of ammonia, phosphate of ammonia, the double salt of the phosphate of ammonia and soda, sulphite of ammonia, chloride of ammonium, iodide and bromide of ammonium, mixture of phosphate of ammonia and chloride of ammonium, chloride of barium, chloride of calcium, biphosphate of lime, sulphate of magnesia, tersulphate of alumina, potash-alum, ammonia-alum, sulphates of iron, copper, and zinc, chlorides of zinc, chlorides of zinc and tin, double salts of proto-chloride of tin, and chloride of ammonium, pink salt (?). The writers state that all inorganic salts applied in solution to fabrics diminish inflammability by absorbing heat and excluding access of air. Of all the salts experimented upon, only four appeared to be applicable for light fabrics. These were:—

1. Phosphate of ammonia.
2. The mixture of phosphate of ammonia and chloride of ammonium.
3. Sulphate of ammonia.
4. Tungstate of soda.

The sulphate of ammonia was found to answer well for treating muslin in the process of finishing, but the muslin would not stand the heat of ironing. Only the tungstate of soda could be recommended for laundry purposes. In practice, in order to avoid the formation in solution of an insoluble bi-tungstate, it was found desirable to add a small proportion of phosphoric acid or phosphate of soda. The salts tested being all soluble washed out when the fabric was wetted. Experiments were therefore carried on with the object of fixing the protective material of the fabric. For this purpose, attempts were made to fix sulphite of baryta, phosphate in alumina, and some silicates, by precipitating them by double decomposition in the fibre; these attempts were all unsuccessful. The oxide of zinc and alumina was found to protect the fibre, but it did not adhere when washed. The oxychloride of antimony proved a good anti-inflammable, and withstood the action of water, but not that of soap and soda. The borate and phosphate of protoxide of tin acted effectually when precipitated in the fibre by ammonia from acid solutions. They withstood washing, but tinged the fabrics yellow. So also did arseniate of tin. Stannates of lime and zinc protected the fabric, but would not withstand soap and soda. Oxides of tin could be permanently fixed, but gave a yellow tinge, and so were only suitable for coarse substances, such as canvas, sail-cloth, etc. It was found, however, that sail-cloth treated with this salt lost in strength, and increased greatly in weight. The conclusion arrived at was that there was little hope that anti-inflammable agents could ever be fixed in fabrics without injury thereto. The final conclusion arrived at advocated the adoption of sulphate of ammonia, and of tungstate of soda in manufactories of light fabrics, and in laundries.

Application of the Soluble Alkaline Silicates.

In 1859, Professor Abel reported to the War-Office on the above subject. A portion of his report dealt with the application of silicates to the protection of wood and fabrics from fire. When a piece of wood, thinly coated with the silicate, is exposed to high temperature, or to contact with flame, the wood emits inflammable vapor which catches fire, but the glazing prevents the solid portion of the wood burning. As soon as the coated wood is removed from the heat, the gases will no longer be evolved, and the flame ceases. In 1854, Mr. Abel instituted experiments with soluble glass, with a view of discovering a method of protecting wooden camp-huts from fire. It was found that a thin coating of silicate afforded considerable protection, but this was diminished by the effect of air and weather on the boards. Successful results were, however, obtained by applying lime-wash over a coating of silicate, and a second coating of silicate over the lime. The hard coating thus obtained resisted rain, and did not exhibit any tendency to crack, shrink, or detach itself from the wood. In 1856, satisfactory experiments were carried out upon a hut thus prepared. The cost of covering wood with the protective material was about 2*d.* for a surface of ten square feet; at the date of the report (1859), it was reduced to half that sum. The following were the difficulties to be met in treating canvas or other similar fabrics:—

1. The protective materials render the fabric very rigid and harsh.

2. The substances employed have a tendency to absorb moisture; and, therefore, to keep the fabric in a very damp condition, an effect which, although promoting the efficacy of the agent, is very inconvenient in many instances.

3. The application is, or soon becomes, detrimental to the strength and durability of the fabric.

4. The materials are of such a nature as to be readily detached from the surface, or to be rubbed or shaken out of the cloth.

5. They are soluble in water, and, therefore, their application must be renewed whenever the fabric has been exposed to wet.

In the case of finer fabrics which require washing, No. 5 would not be of very great importance, inasmuch as the treatment by one of the numerous saline compounds proposed could be repeated. The problem of protecting canvas, such as is used for sails and tents, had been for the first time satisfactorily solved by Messrs. Versmann and Oppenheim, who introduced into the canvas a compound of tin so permanently fixed that washing did not remove it. The strength of the fabric was not affected [but see statement at the end of Versmann and Oppenheim's paper]. The canvas, when exposed to heat, or flame, behaved just like a piece of wood prepared with soluble glass. The only important objections were the great increase in weight, and the costliness of the agent employed. In consequence of this costliness, Professor Abel had undertaken some experiments with soluble glass. Simple saturation with an alkaline silicate afforded efficient but temporary protection. Great difficulties were found in attempts to fix the silicate in the canvas by combination with metallic oxides, but at last a successful method was discovered, of inducing the formation of an insoluble silicate within the fibre, the canvas being thoroughly saturated with the soluble glass, and a second agent [the name of which is not given] before the separation of the new silicate in the insoluble form occurred. The protection afforded was stated by Professor Abel to be thoroughly and permanently effective, while the cost of the material would be very considerably below that of the tin compounds used as the before-mentioned method. An appendix to the report gives an account of the experiments, at Chatham, on huts coated with silicate of soda and lime-washed; also directions for covering timber with protecting solutions of silicate and lime.

THE ILLUSTRATIONS.

HOUSE FOR R. C. JOHNSON, ESQ., WASHINGTON, D. C. MR. CHARLES H. READ, JR., ARCHITECT, WASHINGTON, D. C.

As the site was small and prevented the extension of the house toward the rear, the architect was obliged to dispense with the back stairs and introduced in their place a passenger and trunk lift running from the basement to top of the house.

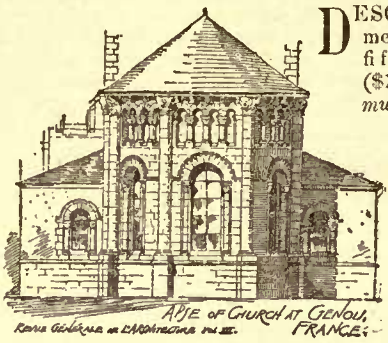
THE FITCH INSTITUTE BUILDING, BUFFALO, N. Y. MR. JAMES G. CUTLER, ARCHITECT, ROCHESTER, N. Y.

PRIZE COMPETITIVE DESIGNS FOR A MECHANIC'S HOUSE SUBMITTED BY "*Minimum*" (MR. J. S. TROWBRIDGE, GLENDALE, O.) AND "*Sweete Simplicite*" (MR. A. C. SCHWEINFURTH, BOSTON, MASS.).

FOR description and comment see elsewhere in this issue.

DESIGNS FOR A MECHANIC'S HOUSE.—I.

DESCRIPTION of design for a mechanic's house to cost about fifteen hundred dollars ($1,500), submitted by "*Minimum.*"



This design contemplates a small, compact, and complete house, suitable in all respects to the purpose for which it is intended. The plan, in arrangement, is at once compact, having little or no waste room, and is also as convenient as practicable.

It is the intention to make the Dining-Room the Living-Room, and hence the chimney-stack has been placed so as to give a flue from the Kitchen and a good-sized fireplace for the Dining-Room. The stairway has been made a "box staircase" in order to lessen the expense, thus saving the cost of a finished stairway with newel-post, balusters, string, etc.

A slight saving in expense has been made by the manner of framing. The studs in the main portion are in 12-foot lengths from sill to wall-plate, the joist resting on a girt 1″ x 5″, sunk into the studs one inch, after the manner of balloon-framing, there being a raised girt at the ends of gables.

A slight saving has also been made in the construction of box-frames, requiring no casing on outside; the hanging-stile is made to project to receive shingles, clapboards, etc.

The cornice and gutter have been formed simply and economically.

A bath-room was considered a luxury and has been omitted entirely, and the only plumbing connected with the house is the cold-water supply to Kitchen sink and drains from conductors.

All the doors and windows are of factory make.

The house is plastered throughout the first and second stories, and is finished complete so as to make the house warm and comfortable in winter.

The finish is all of white-pine prepared for painting.

There will be a cellar under the whole house, well lighted and ventilated.

The shingles on second story and roof are to be merely dipped in oil with Venetian red, to give them tone, and are not to be painted. The first story and all trimmings, finish, etc., to be painted in colors to harmonize with the body of house.

The architect's fee has not been included in the cost of the house, and will be $50 for drawings and specifications, and including two visits during the construction, the first one being at the beginning to see the work started in the proper manner, and a final visit when the building is to be accepted. "*Minimum.*"

BOSTON, April 19, 1883.

"*Minimum:*"

Dear Sir,—I propose to furnish material and perform the labor for building cottage as per plans and specifications for the sum of fifteen hundred ($1,500) dollars. Yours truly, D. PERKINS.

DESIGN SUBMITTED BY "*Sweete Simplicite.*"

ATTENTION would be called to the following facts:—

The prices and quantities have been prepared by a Boston builder of the first class, and would cover nearly any point in the suburbs of that city.

18″ rubble wall for cellar, laid dry; 8″ brick underpinning, for two feet above grade; cellar 7′ in clear; sill, 6″ x 6″; joists, 2″ x 9″ and 2″ x 8″, respectively; rafters, 2″ x 7″; studs, 2″ x 4″, 16″ on centres; gutters, 4″ x 5″, Stearns's cypress; no back-plaster, but double sheathing-paper; shingles laid 5″ to weather. Factory doors and windows. Roof-shingles stained with petroleum. Outside and inside finish, and wall-shingles, one coat oil and two coats lead paint. Inside

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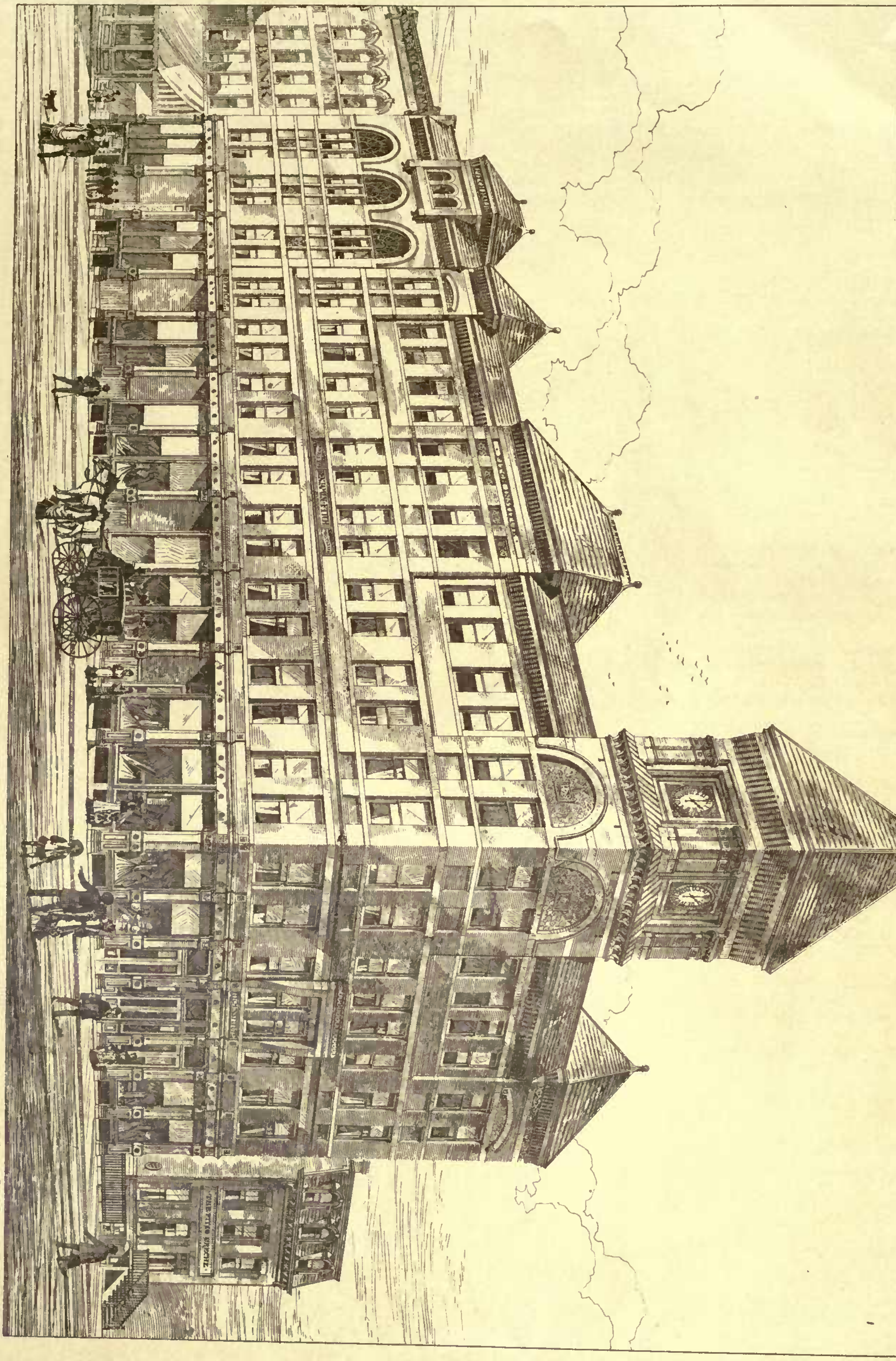

The Fitch Institute Building, Buffalo, N.Y.
James G. Cutler, Architect, Rochester, N.Y.

Heliotype Printing Co. 211 Tremont St. Boston

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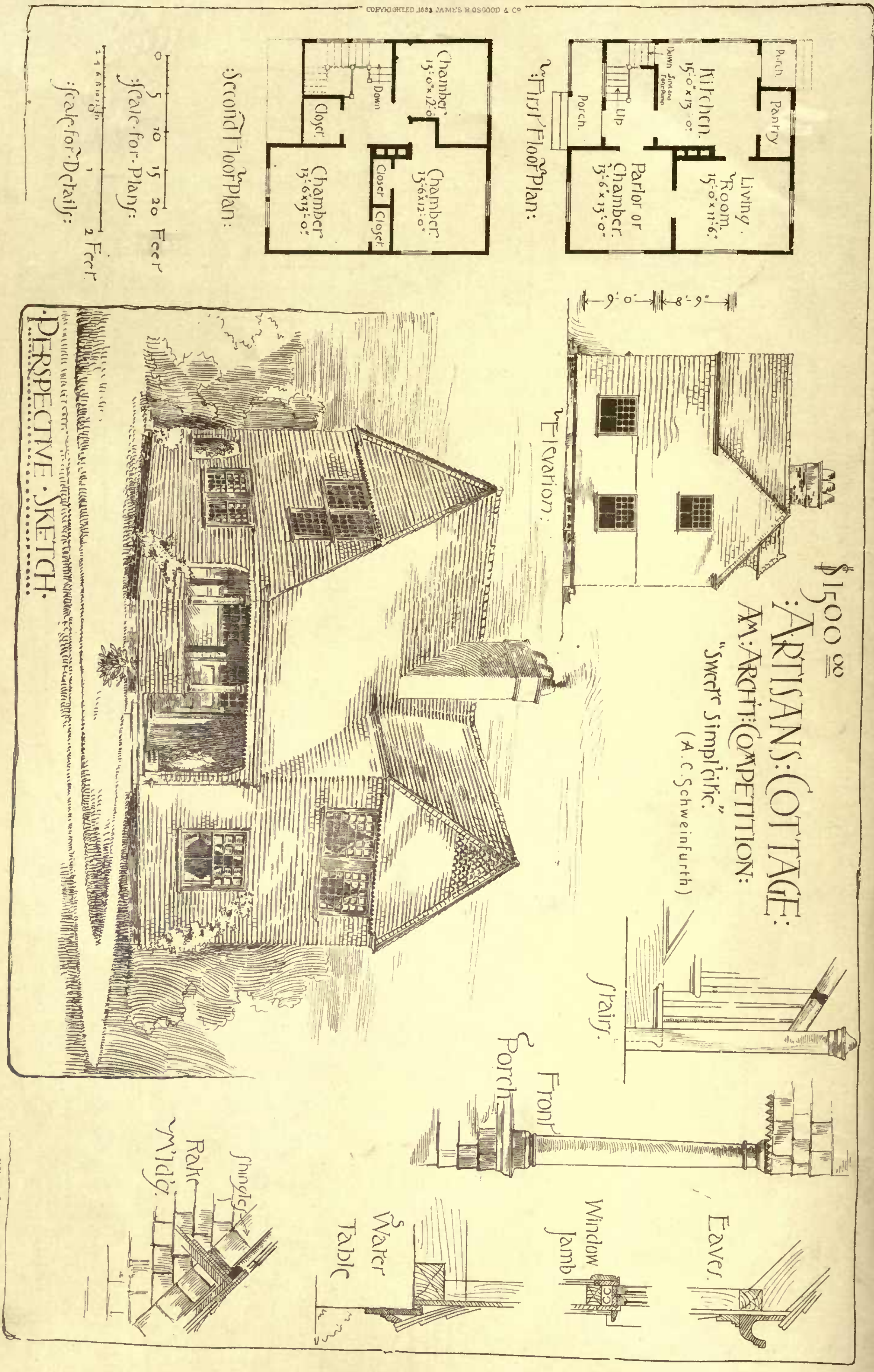

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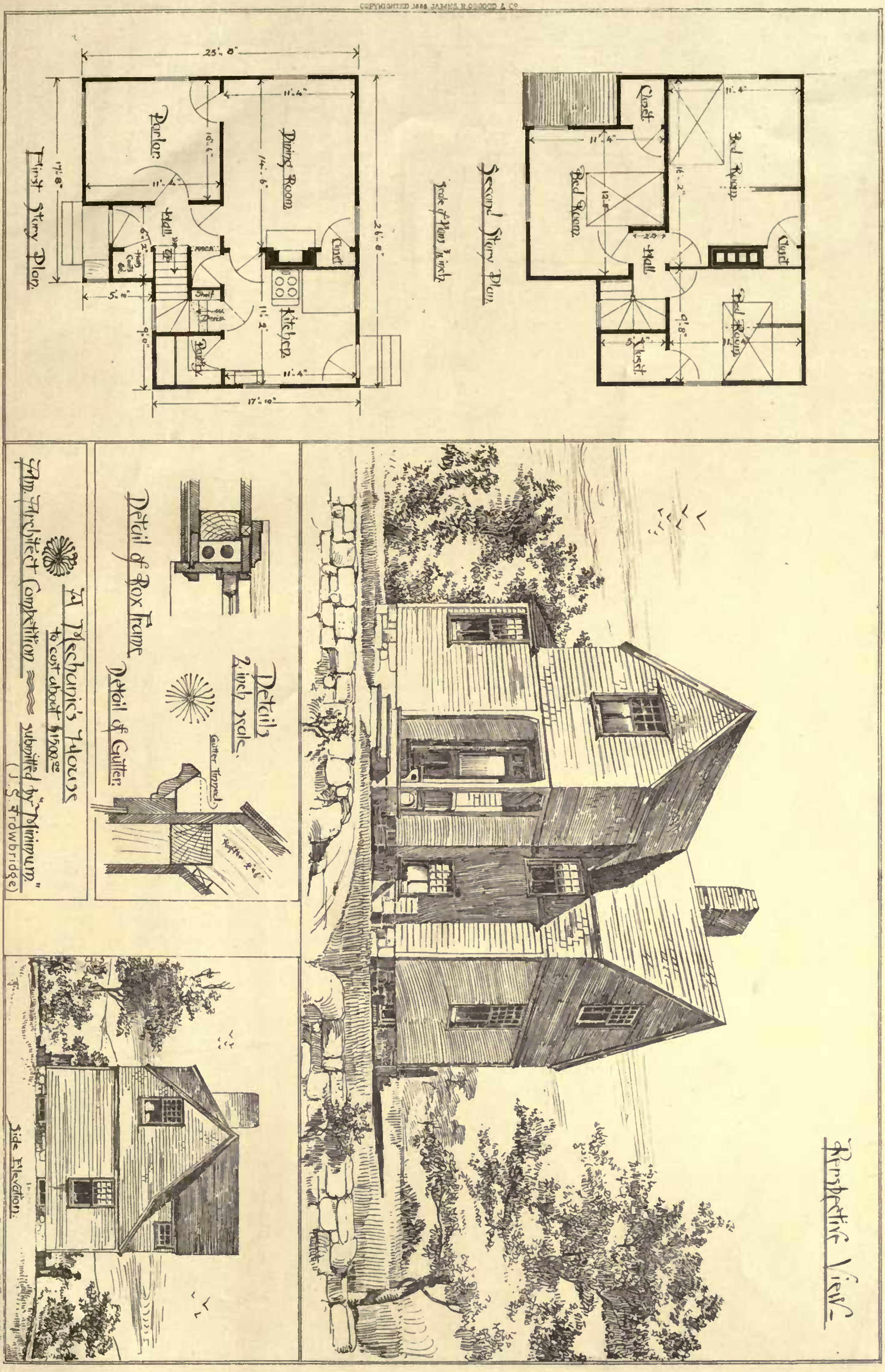

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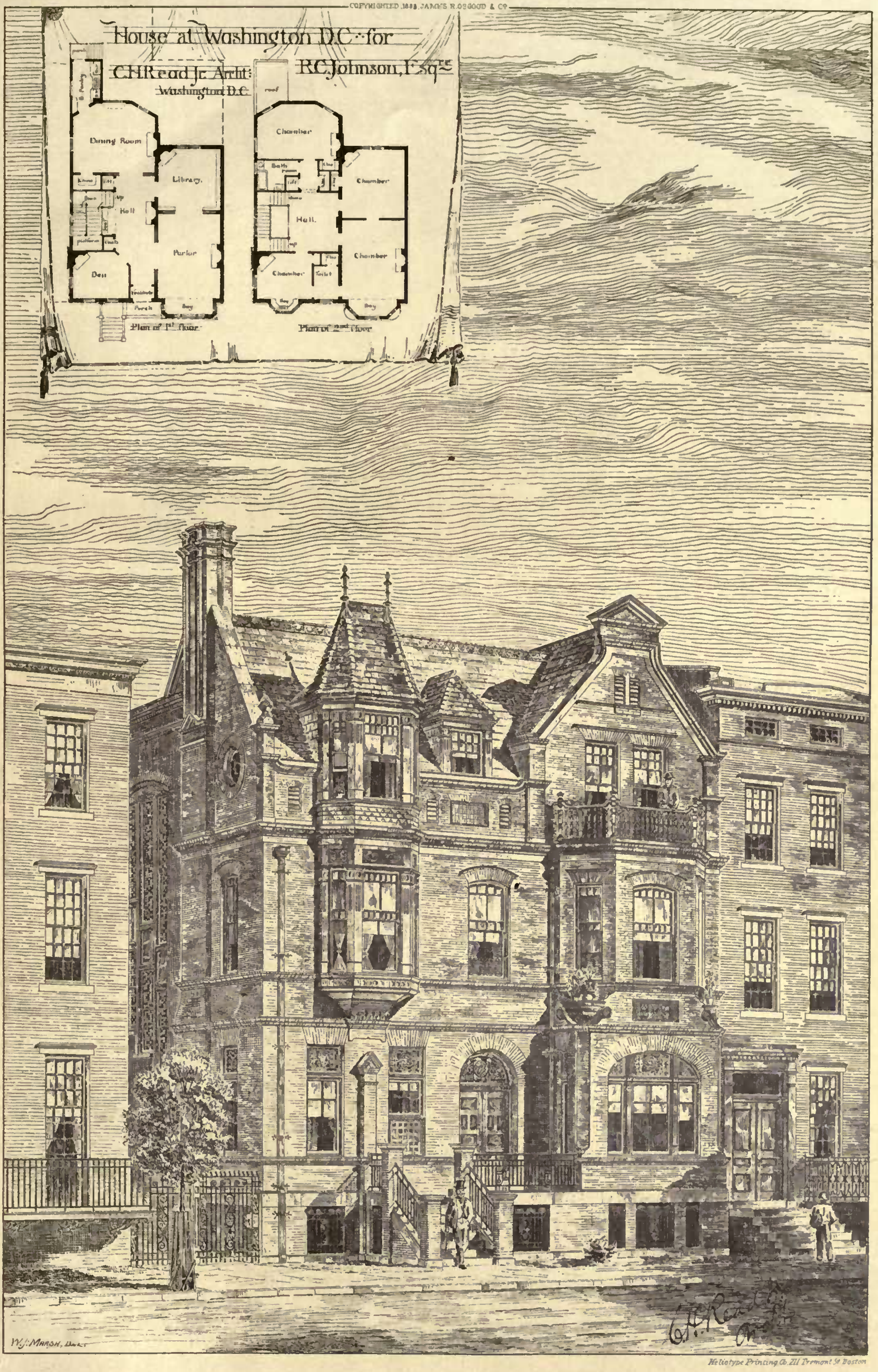


Heliotype Printing Co. 211 Tremont St. Boston

finish, pine, with cherry stair-rail and cap to posts. Simplicity and compactness of plan.

NO. 32 LANCASTER STREET, BOSTON, MASS., April 21, 1883.

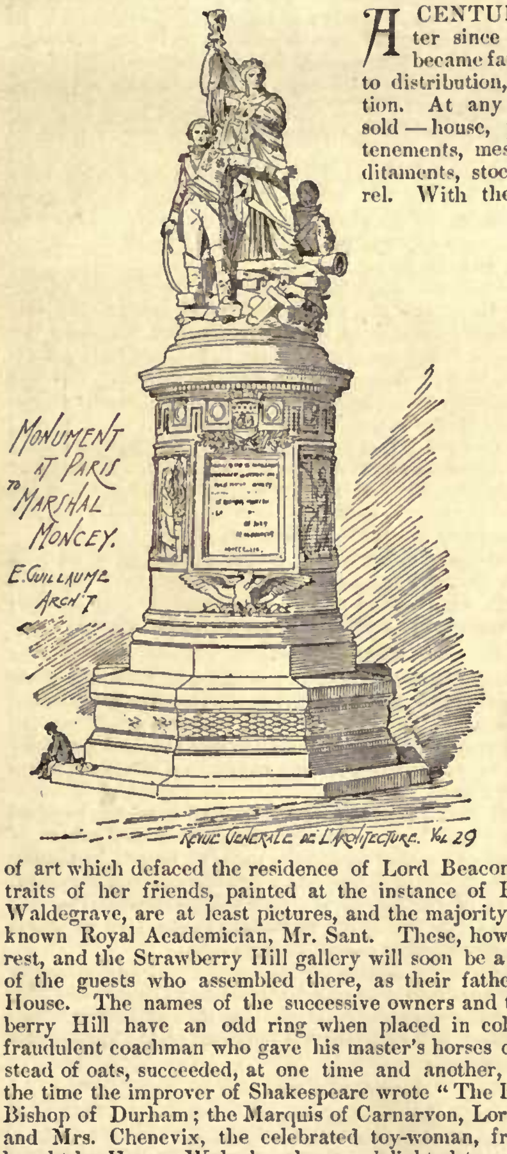
Dear Sir, — I will agree to build the cottage according to the plans marked "*Sweete Simplicite*, all complete, for $1,494.45.

Yours truly, ISAAC MCLEAN.

I find the quantities of material for your proposed cottage are as follows: —

Qty.	Item	Rate	Amount
20	sq. yds. excavation,	@ $1.50 per sq. yd.	$ 30.00
39½	perch stone,	" 2.50 " perch	77.75
700	sq. yds. plaster,	" 25 " sq. yd.	175.00
4600	bricks, laid,		46.00
7000	ft. framing,	@ $14.00 per M	98.00
4000	" rough boards,	" 12.00 " "	48.00
1600	" flooring,	" 22.00 " "	35.20
500	" outside-finish		17.50
26000	" shingles,	@ $3.00 per M	78.00
5	kegs nails,	" 4.00 " keg	20.00
15	doors, frames, and finish,	@ $6.00 per door	90.00
16	windows, frames, and finish,	" 5.00 " window	80.00
400	ft. base and moulding,	" 08 " ft.	32.00
200	" sheathing,	" 03½ " "	7.00
	Sheathing-paper		5.00
	Sink and pump		20.00
	Bell		3.00
	Stairs		50.00
	Bead grounds		10.00
	Teaming		12.00
	Painting		110.00
	Labor and incidentals		450.00
	Total		$1494.45

STRAWBERRY HILL.



A CENTURY and a quarter since Strawberry Hill became famous, it is doomed to distribution, if not to demolition. At any rate it is to be sold — house, pleasaunce, land, tenements, messuages, and hereditaments, stock, lock and barrel. With the exception of a few precious heirlooms, the pictures and furniture will be scattered to the four winds. There is to be an end, so far as human name and fame are destructible, of "Chopped-Straw Hill," built by Lord Bradford's coachman, out of his pickings and stealings, made into a pseudo-Gothic castle by Horace Walpole, and adorned by the last owner, a lady of exceptional talent, tact and beauty, with a gallery of contemporary celebrities, very unlike the fearful works of art which defaced the residence of Lord Beaconsfield. The portraits of her friends, painted at the instance of Frances, Countess Waldegrave, are at least pictures, and the majority are by that well-known Royal Academician, Mr. Sant. These, however, go with the rest, and the Strawberry Hill gallery will soon be a mere recollection of the guests who assembled there, as their fathers did at Holland House. The names of the successive owners and tenants of Strawberry Hill have an odd ring when placed in collocation. To the fraudulent coachman who gave his master's horses chopped straw instead of oats, succeeded, at one time and another, Colley Cibber, at the time the improver of Shakespeare wrote "The Refusal;" Talbot, Bishop of Durham; the Marquis of Carnarvon, Lord John Sackville, and Mrs. Chenevix, the celebrated toy-woman, from whom it was bought by Horace Walpole, who was delighted to see that

"A small Euphrates through the piece is roll'd
And little finches wave their wings in gold,"

and thanked God that the Thames was between him and the Duchess of Queensberry. In his time Twickenham was a Baiæ, as he classically termed it, with "dowagers as plenty as flounders." Twickenham, no longer pronounced "Twit'nam," except by very ancient dowagers, is now a suburb of London, with still a little land to be let on building lease, but with only an occasional flounder in the water to startle the angler, whose fine tackle is rather calculated for roach and dace than flat-fish. Walpole tells us of Lord John Sackville having "instituted certain games called cricketalia," celebrated in honor of him in a neighboring meadow — a fact which may prove interesting to modern wielders of the willow, and it is odd, on the lawn at Strawberry Hill, to reflect that Walpole was stopped by highwaymen on his way thither from town, and that he and the resident dowagers of the neighborhood kept a sharp lookout for burglars, but not sharper than is necessary in this present day, so much more permanent has housebreaking proved than the sister profession of "high-toby." Duval and Turpin have passed into the region of myths, but Jack Sheppard is still to the fore. The robbed seem to have once been as knowing as the robbers, for when Walpole was stopped in company with Lady Browne she expressed great anxiety, after the highwayman had left them, lest he should return, as she had given him a purse with only bad money, which she carried on purpose, as the smugglers of Romney Marsh manufactured base guineas in order to be even with their French confederates, who gave them short measure of the "right Nantz." The physical features of Walpole's retreat have also changed since his day. The river runs with sharper scour in a narrower bed, and the trees planted by Walpole, as well as those of Pope's villa, have had time to grow and remove from the latter the reproach of bareness urged by Walpole with the fanciful indelicacy characteristic of the man and the time.

To English people, and foreigners of mark who lived in the forefront of politics or art, society or letters during part of the last three decades, few houses were or are better known than Strawberry Hill. By her virtues, her social tact and position, her keen intelligence and good nature, Frances, Countess Waldegrave became the centre of a circle unequalled for intellect, rank and reputation, a legitimate but far more agreeable successor of the brilliant society of Holland House. There was no necessity to spread nets to catch lions for Strawberry Hill, for those noble animals naturally gravitated thither. When it is remembered that Lady Waldegrave was married four times, and remained on affectionate terms with the relations of all her husbands till the day of her lamented death, it is easy to understand that the influence exercised by her was of no ordinary kind. So delicate was her sense of appreciation, and, it may be added, reverence, that when she made important additions to Strawberry Hill she faithfully preserved the character of Walpole's sham "Gothic," as he called it, and refrained from sweeping away the little low-browed rooms of Chopped-Straw Hall, which, by the way, was not known by its present name until Walpole discovered it in an old deed. Had she been able to prevent the sale, in 1842, of Walpole's relics, pictures and china, there is little doubt that she would have done so. Pecuniary embarrassment — real, or perhaps, as has been hinted, imaginary — brought about the distribution of nearly all Walpole's treasures, except some family pictures and a very little china and furniture. All the rest was knocked down by that prince of rhetorical auctioneers, George Robins, the same who apologized for the nuisance caused to a country house by cuckoos and nightingales. All the rest of the "rubbish," as it was profanely called by a contemporary Philistine, was scattered to the four winds, including Queen Elizabeth's glove, the tortoise-shell jewelled comb of Mary, Queen of Scots, the spur with which William of Orange pricked his charger through the Boyne, the clock which was Henry VIII's wedding present to Anne Boleyn, the watch of Fairfax, the hat of Wolsey, and the bowl or tub of blue and white china, the cause of the accident immortalized by Gray in the ode "On the death of a favorite cat, drowned in a tub of gold-fishes." The bowl and pedestal were knocked down to the Earl of Derby for forty guineas. The sale took place in the pre-artistic period, and the prices realized were hardly more than a third of present market values. It lasted twenty-four days.

The modern history of Strawberry Hill is that of its occupation by Frances, Countess Waldegrave. When Walpole died he bequeathed it for life to the Hon. Mrs. Damer, who resigned it in 1811 to the Dowager Countess Waldegrave, who held the reversion. The house was subsequently allowed to get out of repair, and was then sold up, as already described. Several years elapsed before Lady Waldegrave was enabled to rescue it from its ruinous condition, to restore it, and add a new wing. The celebrated Waldegrave Gallery of Beauties, or, more correctly, of Lady Waldegrave's friends, male and female, is not, however, in the new part of the house. It is Walpole's old gallery restored, extending from the Round Tower to the original building, and is fifty-six feet long, seventeen feet high, and thirteen feet wide, lighted by stained-glass windows which originally contained all the quarterings of the Walpole family. This handsome room remains as it was at the time of Lady Waldegrave's death, and contains many remarkable portraits of distinguished men and women, the majority painted by Mr. Sant, R. A. As a gallery of contemporary celebrities it is still unrivalled, although here and there it is necessary to prefix the gloomy "late" to the name of a person known all over the civilized world. At the upper end of the gallery is Mr. Sant's fine picture of the Prince and Princess of Wales, the Prince wearing the ribbon of the Garter, and the Princess that of St. Catharine of Russia. Near the picture of the Prince and Princess are the portraits of Lord Palmerston and Lord Halifax, the latter wearing the broad ribbon of the Bath; Mr. Gladstone, and the late Earl Russell — an admirable likeness. On the main wall are portraits of the late M. Van de Weyer, of the late Catharine, Countess of Clarendon, and of the Duchess of Sutherland. One of Mr. Sant's happiest efforts in his favorite arrangement in white is the lovely face of the Baroness Alphonse de Rothschild in the bloom of youth and beauty. Again, one must write the gloomy "late" to the name of the Marchioness of

Northampton, and with more recent sorrow to that of Mrs. Stoner, painted in a light-blue ball dress. Between the Duke and Duchess d'Aumale, painted many years ago, appears Lady Waldegrave herself, by a French artist, a by no means successful portrait. Lady Spencer, with the beautiful Seymour upper lip, appears in black, Lady Alington in white, and Lady Selina Hervey in a superbly becoming costume of black and red — all favorable examples of Mr. Sant's skill, the latter magnificently painted. The late Duchess of Westminster, while yet Lady Constance Grosvenor, and the late Duchess of Sutherland, her mother, are also by the same pencil. Lady Churchill, painted by Sir Francis Grant, and the late Frances, Countess of Morley came next, and then the late Lord Clarendon and Mr. Harcourt, Sir Thomas Erskine May, the Duchess of Manchester, by Miss Tekusch, and by another lady artist, Miss Mortlock, an admirable likeness of the celebrated *raconteur* and Quarterly Reviewer, Mr. Abraham Hayward, one of the most frequent guests at Strawberry Hill.

In the round drawing-room is a portrait of the Marquise de Prie, mistress of the Regent Orleans, presented to Walpole by Mme. du Deffand, who had been her most intimate friend, and in the ante-room is a delightful sketch of Lady Bennet, by Cosway. In the new drawing-room are pictures of world-wide fame, such as Maria, Countess Waldegrave, by Reynolds; Walpole's "My Cousin Walgrave," the beautiful woman who was second illegitimate daughter of Sir Edward Walpole, married the second Earl Waldegrave, became mother of "the Three Graces," and after the Earl's death married William Henry, Duke of Gloucester, by whom she was mother of the late Duke of Gloucester (Silly Billy) and the Princess Sophia of Gloucester. "The Three Graces" themselves, Elizabeth, Charlotte, and Horatia, who became respectively Lady Waldegrave, Lady Euston, and Lady Hugh Seymour, appear in the masterpiece of Sir Joshua, at the end of the room, a picture for which he received eight hundred guineas, or only about thirty-five per cent more than has since been paid for a proof engraving of it. Two of the "Graces" are employed in winding silk, and the third at tambour work or embroidery of some kind, and all three are seated round an oval-topped table, the original of which is still at Strawberry Hill. It will be recollected that a few years ago Mr. John Everett Millais, R. A., painted his celebrated picture of the three Miss Armstrongs, avowedly from the suggestion of Sir Joshua's "Three Graces." The new drawing-room also contains the "Countess of Essex," by Reynolds; Ramsay's "Countess of Dysart," and "Mrs. Keppel;" the marble statue of "The Reading Girl," from the International Exhibition of 1862; a marvellously inlaid pianoforte; and a grand portrait of Sir Robert Walpole, whose ale-tankards were religiously preserved by his son Horace. In the billiard-room is the portrait of the late Lady Waldegrave, in a red velvet gown, painted by Dubufe in 1861; a delicious little picture of a young girl in red, attributed to Romney; Lowes Dickenson's well-known picture of the Liberal Ministry of 1869–74; and a Duchess of Marlborough, by Kneller. In the new dining-room are also several pictures of historic interest, such as portraits of Catherine Shorter, the first, and reputed faithless, wife of Sir Robert Walpole (mother of Horace), and the notorious Dorothy, Lady Townshend, whose letters and conversation were indecent and blasphemous enough to justify all that the satirists of the day could urge against the language of ladies of quality.

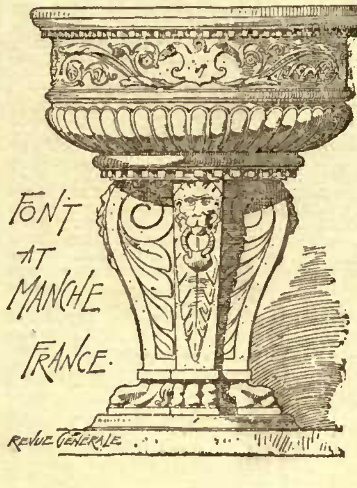
In the little low rooms of the old Chopped-Straw Hall, bought from Mrs. Chenevix, are several curious portraits and engravings. Mrs. Kitty Clive's red face is among the quality up-stairs, the face concerning which Lady Townshend said, after a few oaths, that Strawberry Hill would be "a very pleasant place if Mrs. Clive's face did not rise upon it and make it so hot." Her ladyship, who was the original of the Lady of Quality in "Peregrine Pickle," and Lady Bellaston in "Tom Jones," was in the right as to the rubicund look of Mrs. Clive, but unjust to that excellent comedian, whom Walpole described when in the receipt of a present of venison, as being "up to the elbows in currant jelly and gratitude." Mrs. Clive dwelt at Little Strawberry Hill, not far from the castle, in a house embowered in trees, tenanted after her by the Miss Berrys, and included in the coming sale. Walpole, regardless of plagiarism, called it Clivden, in defiance of "Cliveden's proud alcove," Anne Brudenell's bower higher up the river. If he erred in admiring Mrs. Clive, he nevertheless erred in good company, for Dr. Johnson declared his liking for her. "She always understands what you say," quoth the doctor, of whom the appreciative Catherine said, "I love to sit by Dr. Johnson; he always entertains me."

Among the odds and ends of Strawberry Hill is an engraving of Mr. and Mrs. Garrick enjoying the air at their riverain villa near Hampton. Walpole had, as he puts it, "contracted a sort of intimacy" with Garrick, and wrote to Bentley that the actor had affected to study his taste. Another curious relic is the receipt, preserved in Lord Carlingford's study, given by Alexander Pope for two guineas duly paid to him for his "Iliad," by Bernard Whalley, Esq. There is enough and to spare to be seen "positively for the last time" together at Strawberry Hill. — *London Daily News.*

The Building Trade of England. — The London *Economist* shows that the depression in the building trade of England is easily explicable. Between 1871 and 1881 the growth in population was 14.36 per cent., while in the number of houses inhabited, uninhabited, and building, there was an increase of seventeen per cent. It is an over production.

NATIONAL EXPOSITION OF RAILWAY APPLIANCES. — EXHIBIT OF PRESERVED TIMBER.

American Society of Civil Engineers,
127 East Twenty-third Street, New York, May 24, 1883.



Appreciating that the rapid destruction of the forests in this country, and the consequent advance in the price of timber, give increasing importance to its artificial preparation against decay, the American Society of Civil Engineers, some four years ago, appointed a committee to report upon the "Preservation of Timber."

This committee has been pursuing its labors ever since. It has sent out some 2,000 circulars; corresponded with some 350 persons; examined 104 patents; gathered such reports, pamphlets and publications as it could obtain; and generally collected all the information it could concerning experience in preserving timber in this country and in Europe.

The specimens now exhibited at the Chicago Exposition of Railway Appliances have been gathered by the Committee in the course of this investigation. They are shown in order to call attention to an important economy, which must soon be taken up by our railroads, and have been entered and arranged through the courtesy of the Western Society of Engineers of Chicago, which has kindly appointed a committee for this purpose.

The facts illustrated by these specimens may be briefly referred to: —

Although almost innumerable methods of preserving timber have been tried, there are but few which have been successful. Of these there are at least three, which, when well done, can be relied upon to prolong the life of wood exposed to the elements. These are: kyanizing, burnettizing and creosoting.

In Europe, these methods have passed beyond the domain of experiment. They there produce large economical results. In this country, the principal obstacle to wood preservation has been the cheapness of timber. It did not pay to inject it, because to be effective, the work must be well done, and the cost of effecting this has hitherto added an undue proportion to the price of our cheap woods. It was cheaper to let them rot and to renew them.

This condition of affairs is fast being removed by the rapid enhancement in the price of timber, and the proximate exhaustion of our more available forests; so that the time has probably arrived when it is not only economical but necessary, in many parts of the country, to prepare wood to resist decay in exposed situations.

It is believed that the selection of the proper method to be used, in any particular case, depends upon the proposed subsequent exposure of the timber (dry, wet, marine worms, etc.), and on the amount which its value (unprepared) admits of being expended upon it.

KYANIZING.

This consists in steeping the timber in a solution of corrosive sublimate. Details concerning it will be found in the circular letter issued by Mr. J. B. Francis.

For bridge and trestle timber, for fences in dry soil, and generally for wood exposed to the weather, but not to constant moisture, kyanizing may be relied upon.

The specimens of timber here exhibited, some of hemlock, exposed for forty years at Fort Ontario, Oswego, New York, and others of various kinds of timber exposed for twenty years at Lowell, in a sandy soil, by Mr. Francis, illustrate this point; while the samples of spruce, from the gate-boxes of the Lowell Water-Works, exposed in various soils for ten years, exhibit the effect of various degrees of moisture, and show that kyanized timber should be kept dry.

Kyanizing costs about six dollars per thousand feet, board measure. Under favorable circumstances it may be relied on to double or quadruple the life of the more perishable woods. Where and when it will pay to use this method, will depend upon the price of the timber and its subsequent exposure.

BURNETTIZING.

This consists in injecting the timber with a solution of chloride of zinc. It cannot be done successfully unless the wood is first seasoned, either naturally or artificially, to deprive it of moisture, and make room for the solution. This is forced in under pressure in closed cylinders, and is liable to wash out subsequently from the outer layers of the timber, unless retained in some way.

For cross-ties, and for timber exposed to weather and moisture, but not in very wet situations, burnettizing is probably, in view of the present price of timber, the most economical method to use. It costs, if well done, about five dollars per thousand feet, board measure, or some twenty to twenty-five cents a tie. It can be done for even less, but the result is not likely to be satisfactory.

The hemlock and maple ties here exhibited, which have been in

use fifteen years on the Lehigh and Susquehanna Railroad, and the oak tie, seventeen years in use on the Erie Railway, show the results which may be accomplished. In Germany, burnettized fir and beech ties average fifteen to eighteen years in the track, and this method has there become the favorite for ties, after extensive trial of all the others. This process should by preference be applied to the cheaper and more open-grained woods. It does not answer so well for bridge ties and timber, as burnettized timber is apt to check and split when dry and exposed to the sun.

It will probably not pay to burnettize ties where white oak, or other equally durable woods can be obtained at forty or forty-five cents a tie, but a recent investigation upon one of the Eastern trunk lines, about 1,000 miles long, has indicated the expectation that with white-oak ties at sixty-two cents each, and hemlock ties at twenty-eight cents each, an annual economy of $250,000 may be expected by burnettizing the hemlock, instead of laying down the oak unprepared.

CREOSOTING.

This consists in injecting the timber with hot creosote oil under pressure. The mode of application, and necessity for seasoning, are much the same as for burnettizing.

For timber in very wet situations, or exposed to marine worms, the best method to use is that of creosoting. It is the most effective, but also the most costly of the various processes.

When well done, it costs from $12 to $20 per 1,000 feet, board measure, or about fifty to sixty cents a tie. It is the favorite method used in England, and is there materially cheaper than here, in consequence of the lesser price of the oil.

The English ties here exhibited have been twenty to twenty-two years in use, and show perfect preservation. Ties and timber creosoted in this country are also shown, but have not had so long an exposure. It is probable they would be thrown out of service, by being cut into by the rail, long before they would decay.

Creosote oil is the only effective preservative known against the Teredo Navalis. All other substances have failed. How much of the oil must be injected to prove sufficient, probably depends upon the exposure. The English engineers specify ten or twelve pounds of oil per cubic foot. Some French engineers, and the American engineers who have had experience in the South specify from fourteen to eighteen pounds to the cubic foot, to be quite safe against the teredo. Each additional pound adds about $1.20 per 1,000 feet, board measure, to the cost. Where it will pay to use this process depends upon a number of local circumstances and prices, which cannot well be enumerated here. It is very good but costly.

There are other substances, such as pyrolignite of iron, and sulphate of copper, which have proved fairly effective in preserving timber, but European experience seems to favor most burnettizing and creosoting. The sections of ties here exhibited, as from the Wabash Line, and from that of the New York, Pennsylvania and Ohio, were prepared by a modification of the sulphate of copper process.

The original patents on all the effective processes have long since expired. There are several patented modifications and modes of application, some valuable and some otherwise, which are still in force. Whether it will pay to use them each railroad will decide for itself. As a rule other methods than those which have been mentioned are either less effective, or are untried experiments.

It cannot be too strongly insisted upon that to be effective the work must be well done. The sap or moisture must be gotten out of the timber, and a sufficient amount of antiseptic be put in. If the solution exceeds a certain strength, the wood is rendered brittle and inelastic, so that both skill and honesty are required to accomplish success.

As an inspection subsequent to the doing of the work does not establish the fact whether it has been well done, the safe course for those who may decide to have some timber preserved, is either: —

1. To do the work themselves.
2. To contract it at a sufficient price to reliable parties, keeping an inspector at the works to note the daily working, when the magnitude of the order will warrant it, or
3. To contract the work on such terms that the profits shall depend upon the results accomplished in preserving the wood against decay.

As the Committee of Engineers is still pursuing its investigations, and is endeavoring to account for some anomalies which have come to its notice, it particularly desires to obtain the record of past experiments in this country (especially of failures), in order to ascertain whether the failure (or the success) was due to the preserving agent selected, to the quantity or strength of the solution injected, or to the mode of applying it. Correspondence is therefore solicited, together with such copies of reports or pamphlets as may be accessible.

The Committee of the American Society of Civil Engineers, on the "Preservation of Timber," is as follows: —

It expects to make its final report this year.

O. CHANUTE, Chairman, New York,
E. R. ANDREWS, New York,
E. W. BOWDITCH, Boston,
G. BOUSCAREN, Cincinnati,
C. SHALER SMITH, St. Louis,
J. W. PUTNAM, New Orleans,
B. M. HARROD, New Orleans,
Col. G. H. MENDELL, San Francisco.

The following is the Committee of the Western Society of Engineers, which is in charge of the present exhibit at Chicago: —

L. M. JOHNSON, Chairman, Chicago,
L. P. MOREHOUSE, Chicago,
G. A. M. LILJENCRANTZ, Chicago.

Please address all information, pamphlets, etc., to
Box 859, New York City. O. CHANUTE, Chairman.

SANITARY PRECAUTIONS AFTER FLOODS.

Crowning statue of first premiated design for a monument to the Constituent Assembly, at Versailles, France. M. Formigé, Archt.

THE following instructions emanate from the *Comité Consultatif d'Hygiène Publique*, dated June 12, 1856, and from the *Conseil d'Hygiène Publique, etc., de Salubrité du Departement de la Seine*, dated January 5, 1883, both of France. They are of interest to us on account of last spring's Western floods.

Sanitation of Houses. — Habitations which have been invaded by the waters should receive special care, so that those whom the flood has expelled should not occupy them before they have been made sufficiently healthy for habitation.

They should first be cleaned out as quickly and thoroughly as possible, and freed from all dirt and débris deposited in their different parts by the water.

Continuous aeration and the most active ventilation are the best and most energetic agents of sanitation for houses.

To increase these as much as possible, where it can be done, a large fire should be maintained on the hearth, and the doors and windosw opened so that the light and heat of the sun may contribute their part to purifying the air.

At the same time care must be taken to dig a ditch ten to fifteen inches deep around each house, whose interior is in many cases below the level of the ground, which proceeding realizes one of the simplest and most active sewage systems.

It will also be well, after having torn down all plastering, which will be in a bad condition, to scrape to their bottom all joints in the walls, and to replaster them in the parts of the house most injured, and where bad deposits have principally accumulated. The floors, where such exist, should be carefully attended to, and the soil under them covered with a disinfecting substance, such as pounded charcoal or sand, or else with an impermeable material, such as flagging, paving-blocks, cement, etc. Where the house is several stories high, the top stories should be the first occupied.

Great precautions should also be followed in the treatment of certain articles of furniture, such as beds and mattresses, which must be renovated or replaced, and which should never on any account be used until thoroughly dried.

Sanitary treatment, such as adopted for houses, should be applied with no less vigilance to stables and barns, to prevent epizoötics, whose deplorable consequences there is no need to allude to here.

One peculiar feature it is important to note, though it can only be accidentally produced; it is the possible alteration of the water of wells and springs of potable water, in whose neighborhood matter in a state of decomposition may have been deposited, or piles of excrementitious and organic débris, or which may have been contaminated by the contents of privy-vaults. Attention should be directed to this danger.

To disinfect cellars into which, by agency of the inundations, the contents of privy-vaults may have penetrated, commercial sulphate of zinc may be used, either by sprinkling it in powder in the cellar, or by watering the ground when the water has gone down with a concentrated solution of this salt.

For the same purpose the solution of chloride of zinc, a disinfectant known as "St. Luke's Water," may be employed. It is in daily use in the civil hospitals.

The concentrated solution of sulphate of iron does well, but the disinfection is not so complete as with salts of zinc; it is, however, cheaper.

The last consideration is of little importance, because two kilogrammes (nearly five pounds) of zinc salt, costing less than one franc, are enough.

DOUBLE-THICK SOIL-PIPE.

June 13, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I see that the Health Department in New York require extra heavy soil and waste pipe for buildings over sixty-five feet in height. This is excellent; now cannot they go farther, and adopt and enforce some regulation by which X pipe shall be properly made, with uniform thickness of metal all around, instead of being often enormously thick on one side and dangerously thin on the other? I have been told that some of the manufacturers of soil-pipe, the Mott Iron Works for example, regard X pipe as a fancy article, about which no particular care is requisite, provided the consumer does not detect the faults; and certainly some specimens of their pipe which I have seen look as if they had been cast flat, or the core allowed to look out for itself in some other way. We expect better things from the Mott Company, and as many of us architects are doing what we can to make the use of double-thick pipe general, it is peculiarly exasperating to find that as we get it, it is less to be depended upon than the single-thick, and that by reason of faults which it is almost impossible for us to detect without breaking the pipes. If no maker is disposed to guarantee the quality of

his pipes, it would not be very unreasonable, it seems to me, to have an inspector from the Department stationed at the large manufactories, whose stamp should be a certificate that they were properly made. If that were done, we could require the stamped pipe in our specifications, and would know whether we got it.

Very truly yours, Double Hub.

[We leave this for some one else to answer. — Eds. American Architect.]

GLASS ROOF-TILES.

Washington, June 14, 1883.

To the Editors of the American Architect: —

Gentlemen, — We believe we have had lately a circular from a firm who manufacture an article of glass, exactly of the thickness and size of a plate of roofing-slate, to be used with and to be hung like the slates, only that they are transparent and serve the purpose of skylights in pitched slate-roofs without attracting attention. If you can communicate or elicit through your columns the information sought for you will oblige Cluss & Schulze, Architects.

[We believe the glass roofing-tiles are manufactured at Pittsburgh, Pa., and trust that some of our readers in that city will be able to furnish the specific information required. — Eds. American Architect.]

STUDIES FOR BEGINNERS.

Chicago, June 12, 1883.

To the Editors of the American Architect: —

Dear Sirs, — I beg your pardon for occupying your valuable time by asking an answer on the following by you. I am a young draughtsman (nineteen years of age) in a situation with an architect (where I earn sixty dollars a month), have acquired some knowledge of general business work, viz.: practical drawing in plans, elevations and details, but, as yet, know only a little of perspective, and to some extent superintendence. I studied Fergusson's "*History of Architecture,*" and the works of M. Viollet-le-Duc; read the "*American Architect,*" the "*Decorator and Art Furnisher,*" etc., but have *not* any knowledge of the more difficult calculations necessary for construction, neither much ability in designing, *i. e.,* from my own inspiration. And now you would greatly oblige a subscriber to your paper by pointing out which is the best way to become a prominent member of the profession (but I have not much money to spend in this direction). And is there a chance anywhere in this country to earn something and at the same time attend a college, as this is sometimes the case in the old world? Very respectfully, P. Mueller.

[The quickest and most economical way of obtaining a proper start in professional life is to enter some good architectural school, and pursue the course with all possible diligence, untrammelled and unimpeded by any work pursued outside the school at the same time. If circumstances require that our correspondent should adopt instead the slow and blundering process of teaching himself, he will find the three volumes of the South Kensington text-book on *Building Construction* the best work to begin upon. Trautwine's *Engineer's Hand-Book* will later give him the beginning of a great deal of useful knowledge, which he should fit himself to understand by a course of study in plane geometry and plane trigonometry. After this Greene's *Graphical Analysis,* in three small volumes, will, if he is prepared to comprehend it, carry him still farther in the science of construction. To learn design, the only way after a thorough drill in the classic orders and forms, is to practise it continually, trying all sorts of problems, with, if possible, the help of a good architect to criticise his efforts. The problems should be of the simplest kind, and should at first be treated with strict reference to classical precedent, leaving all attempts at original or mediæval treatment until the taste has been well disciplined to the elegance of the antique forms and proportions. As the habit of thinking in architectural forms becomes stronger, more difficult programmes may be undertaken, but always with caution. In the intervals of his studies in design, our correspondent, with others who have the same ambition, should perfect himself in drawing and sketching from plaster casts of sculpture and architectural detail, and as soon as he can handle charcoal and crayon well enough, should find or make for himself opportunities for drawing regularly from the life. From Phidias and the Italian cinque-centoists down to William Burges, this practice has been the fountain of originality and artistic excellence in the architecture of those nations and individuals who have followed it, and no one who has suffered himself to be once penetrated with the infinite charm of modelling and line, and breadth of light and shade, of the human form, will ever afterwards entirely lose, in the pursuit of vulgar architectural fashions, the sense of beauty which can alone give his work a permanent artistic value.— Eds. American Architect.]

"THE GOLDEN BOUGH."

Newtonville, Mass., June 19, 1883.

To the Editors of the American Architect: —

Dear Sirs, — In answer to the query of "Avernus" in your last issue, I would say that "*The Golden Bough*" was a branch of the tree of Proserpine, which, when plucked by mortals through the favor of the Fates, enabled them to visit and to return from the infernal regions with impunity. W. R.

NOTES AND CLIPPINGS.

Cologne Cathedral. — Since work on the Cologne Cathedral was begun in 1864, nearly 11,000,000 marks have been expended. The last sheds about the structure are now being taken down and the terrace in front will speedily be put in order. When this has been done the noble pile will be considered finished within and without, the new flagging only excepted. For the tearing down of the incumbrances on the western side it is believed that a sum of more than 500,000 marks will be needed, a part of which will have to be raised by another lottery. — *Exchange.*

Architectural Exhibition, Brussels. — The Central Society of Architecture, Belgium, is organizing an Architectural Exhibition, with the support of the Government and the Municipal College of the capital. It is arranged to be open from September 2 to 30 next, in the new Palais de Justice, Brussels. The society appeals to archæologists to lend for the retrospective section drawings of buildings erected previously to 1833, and designed either by Belgian or by foreign architects. Further particulars may be obtained from the secretary, M. Charles Neute, architect, 128, Rue Royale, Sainte-Marie, Brussels.

The Ailantus Tree. — Of trees introduced into the United States, says the *American Lumberman,* the ailantus is said to be a much more valuable one than is generally admitted. For posts no timber is better suited. The testimony of many farmers shows that it is nearly as good as locust, and for fuel is equal to oak. It is hardy, grows rapidly, and is said to be well adapted to growth on the prairies in the Western United States. In its native country (China) it often attains a height of 175 feet. The cork tree could also doubtless be cultivated in many parts of the United States with success. In 1859 a farmer in Wayne County, Mississippi, "planted some Spanish cork acorns received from the Department of Agriculture. Twelve years later he had trees from these acorns, the largest of which were 13 feet in height, 11 inches in diameter, and the cork around the body was more than one inch in thickness."

Church of the Saviour, Moscow.—The consecration of the Church of the Saviour, at Moscow, one of the most brilliant features connected with the coronation, took place yesterday. The Czar and Czarina, with the rest of the imperial family, the foreign ambassadors, and an immense crowd of people, were present. This enormous and magnificent temple — "Krahm Spaseetelya" in the vernacular — was begun so far back as 1833. Nearly four thousand laborers for a month were employed in digging out the ground for the foundations, and considerable energy was displayed in building the base, but after a while operations languished and the work went on by fits and starts. The height of the structure is 288 feet, and the style of architecture is the Russo Byzantine, the building being in the form of a Greek cross surmounted by five cupolas, one on each corner, and a large one, or dome in the centre. The roof and the framework of the cupola weigh 1,800 tons, and the gilding on the latter consumed more than half a ton of gold leaf. Above the central cupola is a massive bronze cross, which can be seen from every part of Moscow. The height of its dome is 369 feet. If the celebrated tower of Ivan Veliki were placed under this dome its cross would come fourteen feet short of reaching its inner surface. The Usspensky Cathedral might stand within this church. The bronze frames of the windows, each nine yards high, weigh nearly three tons, and the hinges of the bronze doors have to support five and one-quarter tons of metal. Inside the walls are gorgeously decorated in the usual style of Russian churches, and contain a number of jasper pillars, each of which cost upwards of $13,000. The total cost of this wonderful building is estimated to exceed 20,000,000 rubles, or nearly $15,000,000. But this is not all. Recently the architect reported that a block of houses in proximity to the temple was detrimental to one of the aspects, and the synod voted $1,000,000 to demolish the buildings and to construct in their place a terrace. It must not be forgotten that this is the second great cathedral which Russia has raised during the last sixty years, the famous one of St. Isaac's, in St. Petersburg, having been begun in 1819, and consecrated in 1858, after an expenditure of 36,000,000 rubles, or $26,000,000. A third cathedral, not quite so large, is also rising at Nijni Novgorod, and will involve an outlay of $10,000,000 before completion. — *Philadelphia Telegraph.*

Ragusa.— There is no little city in Europe, actually none, so curious, so interesting, as Ragusa. Persons better acquainted with that coast have told me that in quaintness other Slav-Venetian towns may challenge it. My own experience of Cattaro and Antivari confirms this statement in some measure. But Ragusa is unique in memorials of ancient state and wealth, and above all in its story. Of that story, in truth, I have learned but just enough to see that most students read it in a different version. It is one, however, of special fascination. This is the antique capital of that single branch in the Southern Sclav family which has yet proved itself European in any sense other than geographical. It was a republic, the rival of Venice in arms and arts, commerce and enterprise, for ages. The winged lion finally overcame and enslaved it, but Ragusan patriots will not admit that their forefathers were conquered by Venice. It was the shadow of the Turk that vanquished them, the iron barrier crushing their small territory, the incessant threats of a malicious savage. I have no opinion on that matter. The legend of Ragusa thrills one like that of a mysterious and silent ruin. Be it remembered that this small, sleepy town gave us the fine word "argosy," for a great ship stored with costliest goods. From one stately gateway in the massive walls to the other is but a hundred and fifty yards at most, but at every yard one may pause to admire. Just within, on the right hand, is a fountain, somewhat of the Turkish style. On market days and holidays it is a pretty sight when the girls assemble at this place. Every village has its peculiarity of dress, mostly bright in color, but the Herzegovinian is so supremely charming that it kills all others. The robe, of coarse black cloth, should be properly called a chemise; it has little ornament. But from the round "turban" cap descends a veil, framing a face often pretty, always pleasing to the eye, thus set off. This drapery is of thick white material, falling to the bottom of the skirt, and so large that a girl can wrap her whole body therein if she please. World-wide travel has not shown me a dress so becoming in severe simplicity. Opposite to the fountain is a church, and then the broad, fine street, smoothly paved, stretches to the other gate. Its blocks of stone houses date, they tell me, from the fourteenth century; saving the tones which age alone can give, they might have been raised yesterday. Tall, solid, exactly alike and precisely aligned, they present that ideal of street architecture which we are laboriously trying to introduce; but we shall not easily match these handsome structures. Between each block endless flights of steps climb the mountain side, with a narrow landing at intervals.— *Belgravia.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

279,150. FIRE-ESCAPE. — Charles C. Griswold, Chicago, Ill.

279,155-'56. WINDOW-SLAT ADJUSTER. — George Hayes, New York, N. Y.

279,167. COMBINED WINDOW-PLATFORM AND FIRE-ESCAPE. — Thomas Jarvis, Chicago, Ill.

279,175. FIRE-ESCAPE. — Christian Meyer, St. Paul, Minn.

279,183. APPARATUS FOR OPERATING SELF-FLUSHING CLOSETS. — Thomas Prosser, Montreal, Quebec, Can.

279,186. FIRE-ESCAPE. — Thomas W. Ricker, Boston, Mass.

279,190. SURVEYOR'S STEEL CHAIN-TAPE AND REEL. — Fred J. Sager, Marysville, O.

279,204. AUGER. — James Swan, Seymour, Conn.

279,207. PIPE-CUTTER. — Caleb C. Walworth, Boston, Mass.

279,218. DEVICE FOR COVERING WATER-CLOSET SEATS. — Michel Bonnefond, Paris, France.

279,249. GIRDER AND BEAM. — Peter H. Jackson, San Francisco, Cal.

279,260. BENCH-VISE. — Mortimer G. Lewis, Lowville, N. Y.

279,271. WRENCH. — Frederick E. Okie, Linwood, and J. Fourestier Simpson, Philadelphia, Pa.

279,287. CLAPBOARD-SAWING MACHINE. — Horace Taber, Manistee, Mich.

279,305. HOISTING-APPARATUS. — Wm. W. Wythe, Red Bank, N. J.

279,316. PLUMB-BOB. — George C. Avery, Louisville, Ky.

279,331. DOOR-BOLT. — Charles Clark, Smyrna, Tenn.

279,347-348. FIRE-ESCAPE. — Charles E. Creecy and Alexander B. Burns, Washington, D. C.

279,357. ART OF MANUFACTURING PORTLAND CEMENT. — Edward J. De Smedt, Washington, D. C.

279,364. WINDOW. — Milton L. Edmunds, Danbury, Iowa.

279,374. CATCH-BASIN. — Thiebeaud Gallat, Cincinnati, O.

279,379. METALLIC PIVOT FOR WINDOW-BLIND SLATS. — Benjamin F. Hall, Lansing, Mich.

279,402. MOULD FOR ROOFING-TILES. — Lorenzo Lane and Laurin D. Woodworth, Youngstown, O.

279,409. ALARM-LOCK. — Edouard J. Masseron, Paris, France.

279,422. CONSTRUCTING TOWERS. — Edward J. O'Beirne, Evansville, Ind.

279,423. IMITATION STAINED-GLASS. — Eugene E. Oudin, New York, N. Y.

279,425. WEATHER-STRIP. — Lucius Parmele, Mackinaw, Ill.

279,433. FIREPLACE. — Henry Rembert, Willis, Tex.

279,442. BALANCE DOOR-HANGER. — Roger S. Henderson and Amos Sanders, Philadelphia, Pa.

279,443. COMBINATION-LEVEL. — James H. Sands, Houston, Tex.

279,460. PARALLEL DIVIDERS. — James B. Tetley, Pittsburgh, Pa.

279,465. GLASS ROOF. — William Ward, Cleveland, Ohio.

279,487. ROOFING-SHINGLE. — Henry Anwyl Jones, Brooklyn, N. Y.

279,488. TOOL FOR DRESSING STONE. — Hiram A. Kimball, Philadelphia, Pa.

279,501. WEATHER-STRIP. — Thomas S. Pruner, Sioux Falls, Dak.

SUMMARY OF THE WEEK.

Baltimore.

PARSONAGE. — Messrs. J. A. & W. T. Wilson, architects, have prepared drawings for a two-st'y brick and stone parsonage for Christ Church, on St. Paul St., between Eager and Chase Sts.; cost, $14,000.

DWELLING. — Mrs. Green is about to build a three-st'y brick and Belleville brownstone house, cor. Park Pl. and Milton St., and a two-st'y brick stable in its rear, from designs by Messrs. Wyatt & Sperry, architects; John J. Brown, builder.

BUILDING PERMITS. — Since our last report twenty-three permits have been granted, the more important of which are the following: —

Louis Kroeger, 3 three-st'y brick buildings, w s Schroeder St., between Pratt and Lombard Sts.

Elias Weal, 2 two-st'y brick buildings, e s China Alley, between Hamburg and Fremont Sts.

Eliza Simpson, three-st'y brick building, 74 Granby St., between Exeter St. and Central Ave.

O. Green, three-st'y brick building, n e cor. Park Ave. and Wilson St.

Geo. R. Presstman, 5 two-st'y brick buildings, s s Lancaster St., between Chesapeake and Dawson Sts., and 5 two-st'y brick buildings, e s Dawson St., between Lancaster and Hutchins Sts.

Henry Bach, 3 two-st'y brick buildings, e s Fulton St., s of Pratt St.

Nicholas Meeth, three-st'y brick building, w s Hanover St., between Fort Ave. and Clement St.

Michael Kane, three-st'y brick building, w s Hanover St., between Fort Ave. and Clement St.

Boston.

HOUSES. — A three-st'y house, 28' x 80', is being built on Beacon St., for Mr. R. D. Evans; Leander Greeley and T. J. Whidden are the contractors for the carpenter and mason work respectively; Messrs. Allen & Kenway, of Boston, are the architects.

A house for Mr. C. T. Hubbard is now being built on Marlboro St., from plans of Messrs. Allen & Kenway, of Boston; materials, brick, stone and terra-cotta, 26' x 65'; Vinal & Dodge, masons; McNeil Bros., carpenters.

BUILDING PERMITS. — *Brick. — Maitland St.*, Ward 22, for Sarah E. Lawrence, family hotel, 32' and 37' x 61' and 64', three-st'y flat; I. and H. M. Harmon, builders.

Commonwealth Ave., cor. Fairfield St., Ward 11, for W. G. Saltonstall, dwell., 30' x 78' 6", four-st'y flat; Woodbury & Leighton, builders.

Wood. — Lamartine St., near Wyman St., Ward 23, for James A. Frampton, dwell., 33' x 33', three-st'y flat; Jacob Luippold, builder.

Roxbury St., No. 249, rear, Ward 19, for Michael Conroy, dwell., 25' 6" x 38', three-st'y flat; Thomas O'Grady, builder.

Brooklyn.

BUILDING PERMITS. — *Dean St.*, n s, 173' w Grand Ave., two two-st'y frame dwells., gravel roofs; cost, each, $10,000; owner, M. E. Fowler, 8 Verona Pl.; architect and builder, L. Fowler.

Foot of Seventeenth and Eighteenth Sts., 400' w Third Ave., one-st'y frame shed; cost, $3,000; owners, Nelson Bros., 514 Hamilton Ave.; architect, C. B. Fish; builder, C. E. King.

Clinton Ave., e s, 135' 4" Gates Ave., three-st'y brownstone front dwell., tin roof; cost, $14,000; owner, D. C. Porter, 261 Waverly Ave.; architect, J. Mumford; builders, C. Cameron and Wright & Brook.

Pacific St., s s, 250' e Smith St., four-st'y and basement brick stable and factory, tin roof; cost, $20,000; owners, Figge & Bro., Atlantic Ave., cor. Smith St.; architect, J. Mumford; builders, J. H. O'Rourke and W. Lang.

De Kalb Ave., n s, 200' w Tompkins Ave., 3 four-st'y brick stores and dwells., gravel roofs; cost, each, $12,000; owner, H. O. Pearce, Willoughby Ave., cor. Throop Ave.; architect, M. J. Morrill; mason, J. Campbell.

Halsey St., s s, 300' w Reid Ave., 3 two-st'y brownstone front dwells., gravel roofs; cost, each, $4,500; owner and builder, Peter Donlon, 724 Sackett St.; architect, J. E. Styles.

Brooklyn Ave., s w cor. Dean St., 4 three-st'y brownstone front dwells., gravel roofs; cost, each, $9,500; owner, Jordan L. Snediker, Halsey St.; architect, A. Hill; builders, J. Rickard and A. Miller.

Humboldt St., e s, 20' n Withers St., three-st'y frame tenement, tin roof; cost, $3,800; owner, Daniel Keefe, 591 Grand St.; architect, A. Herbert; builder, J. Schoch.

Lefferts Pl., s w cor. Franklin Ave., 2 three-st'y and basement brownstone front dwells., tin roofs; cost, $11,000 and $7,500; owner, A. Tredwell, 540 Franklin Ave.; architect and builder, J. S. Frost.

Franklin Ave., w s, 80' s Lefferts Pl., three-st'y brownstone front dwell.; cost, $6,000; owner, etc., same as last.

Lafayette Ave., s s, 293' e Broadway, two-st'y brick dwell., tin roof; cost, $4,780; owner, F. Y. Bohannon, 989 Broadway; architect and builder, G. H. Bohannon; mason, W. Potivar.

Delevan St., e s, about 138' e Richards St., five-st'y brick factory, iron roof and cornice; cost, $20,000; owner, Cheesbrough Manufacturing Company, State St., cor. Bridge St., New York; architect, A. Hatfield.

Clermont Ave., e s, 20' n Greene Ave., five-st'y granite front dwell., slate and metal roof; cost, $50,000; owner, R. C. Cathedral Corporation; architect, P. C. Keely.

Wolcott St., No. 60, n s, 80' w Richards St., three-st'y frame tenement, tin roof; cost, $3,300; owner, Patrick Banks, 49 Wolcott St.; architect, G. Damen; mason, P. McQuinn.

Conover St., No. 233, e s, 100' n Elizabeth St., four-st'y double tenement, tin roof; cost, $8,200; owner, Julius Fehlbaber, on premises; architect, P. Radermann; masons, P. Kelly & Son.

Fourth Pl., No. 62, three-st'y and basement brick tenement, tin roof; cost, $8,000; owner, Jas. Cross, 138 Luqueer St.; architect, G. Damen; mason, P. McQuinn.

President St., s s, 192' w Hoyt St., 4 three-st'y and 1 two-st'y and basement brownstone front dwells., gravel roofs; cost, each, $4,500; owner, Chester Bedell, 237 Smith St.; architect and builder, Theo. Pearson; mason, Walton Smith.

Norman Ave., No. 112, near Leonard St., four-st'y frame store and double tenement, gravel roof; cost, $6,000; owner, Wm. Lehing, 116 Norman Ave.; architect, J. P. Leo; builders, Randall & Miller.

Keap St., s s, 150' e Marcy Ave., 3 three-st'y brownstone front dwells., tin roofs; cost, each, $5,500; owner, architect and builder, Thos. B. Saddington, 263 Hewes St.

Middleton St., s s, 260' e Harrison Ave., 4 three-st'y frame double tenements, tin roofs; cost, each, $4,500; owner, B. Bossert, Harrison Ave., near Lynch St.; architect, J. Platte; builders, J. Auer and F. Herts.

Union St., s s, 190' w Fifth Ave., also, *President St.*, n s, 190' w Fifth Ave., 12 two-st'y brick dwells., tin roofs; cost, each, $2,500, owner, architect and builder, E. C. Squance, 238 Eleventh St.

Chicago.

STORES. — C. Chapman, architect, has on hand five-st'y building, 30' x 100', on Michigan Ave., n of Randolph St., for Thomas Hoyne, pressed-brick, stone finish.

By same architect, 2 stores for P. Ryan, 682 and 684 West Indiana St.

Also, same architect, stores, cor. Thirty-fourth and Halsted Sts., and cor. of Robey and West Indiana Sts.

BUILDING PERMITS. — E. Jalor, two-st'y brick flats, 21' x 48', 66 Wesson St.; cost, $3,000.

Lindahl & Johnson, two-st'y brick flats, 22' x 70', 148 Oak St.; cost, $5,000.

Aug. Sickel, two-st'y store and dwell., 25' x 68', 870 North Halsted St.; cost, $3,000.

H. Will, 2 two st'y basement dwells., 44' x 73', 481-483 Adams St.; cost, $7,000.

A. K. W. Schmidt, two-st'y store and dwell., 25' x 60', 715 Ogden Ave.; cost, $4,000.

John Riddle, two-st'y dwell., 22' x 50', 3455 Dearborn St.; cost, $4,000.

G. M. Gungrich, two-st'y brick moulding-factory, 75' x 75', 15-19 Armour St.; cost, $6,800.

G. Sporrer, three-st'y dwell., 25' x 65', 507 North Clark St.; cost, $7,500.

Jno. Sladik, two-st'y basement dwell., 21' x 34', 827 Allport Ave.; cost, $3,000.

James O. Callaghan, three-st'y stores and flats, 40' x 63', Halsted St., cor. Thirty-fourth St.; cost, $7,000.

Jno. Cudahy, two-st'y brick barn, 27' x 58', 3213 Wabash Ave.; cost, $3,000.

J. Parker, two-st'y basement dwell., 22' x 45', 44 O'Brien St.; cost, $3,000.

A. Chemelck, two-st'y basement dwell., 21' x 58', 737 Loomis St.; cost, $3,200.

F. Fraubmann, three-st'y dwell., 25' x 70', 515 North Clark St.; cost, $10,000.

W. W. Cole, two-st'y basement dwell., 25' x 96', 284 Rush St.; cost, $10,000.

John Scully, three-st'y basement store and dwell., 24' x 74', 511 South Halsted St.; cost, $7,000.

J. Keighor, two-st'y store and dwell., 25' x 60', 428 Indiana St.; cost, $4,000.

Catholic Bishop of Chicago, three-st'y basement academy, 90' x 113', s w cor. Park Ave. and Oakly Sts.; cost, $30,000.

Isaac Tomlinson, four-st'y brick factory, 50' x 123', Arnold St., near Twenty-third St.; cost, $20,000.

C. O. Gleeson, 2 two-st'y dwells., 33' x 48', 3624-3626 Stanton Ave.; cost, $4,000.

Agatha R. Ward, three-st'y brick factory, 60' x 70', 110-112½ South Jefferson St.; cost, $15,000.

Jos. Koerper, two-st'y dwell., 22' x 60', 582 Wells St.; cost, $3,000.

M. Gaensclow, three-st'y dwell., 32' x 67', 603 Dearborn St.; cost, $10,000.

Herbert Cassard, three-st'y brick stores and dwell., 66' x 105', 3300-3308 South Water St.; cost, $35,000.

Paul C. Cassius, two-st'y store and dwell., 25' x 110, 260 Lincoln Ave.; cost, $6,000.

Carl Hochstadt, three-st'y dwell., 22' x 57', 569 Wills St.; cost, $5,000.

Dr. Knox, two-st'y dwell., 22' x 50', 610 Fulton St.; cost, $4,000.

W. E. Hall, three-st'y stores and flats, 71' x 90', 207 and 209 Thirty-first St.; cost, $21,000.

H. Stautz, two-st'y stores and dwell., 25' x 45', 2725 Wentworth St.; cost, $3,200.

Chas. Follinsbee, 2 two-st'y dwells., 33' x 40', 469 Warren Ave.; cost, $3,500.

John Kedzie, 2 four-st'y stores and dwells., 44' x 72', 471-473 Madison St.; cost, $22,000.

H. Hemmelgorn, 2 two-st'y dwells., 36' x 50', Fullerton Ave., cor. Larrabee St.; cost, $11,000.

J. A. Sweet, two-st'y dwell., 27' x 66', Warren Ave.; cost, $8,000.

J. G. Owsley, two-st'y dwell., 20' x 63', Adams St., near Robey St.; cost, $8,000.

J. Jacobson, 4 cottages, 20' x 32' each, 781-785 Seymour St.; cost, $4,000.

C. Busby, 3 two-st'y dwells., 64' x 69', 11-15 Carpenter St.; cost, $10,000.

C. Busby, three-st'y basement store and dwell., 24' x 67', 752 West Madison St.; cost, $8,000.

Marshall & Paulett, 6 two st'y flats, 63' x 123', 1029-1039 Adams St.; cost, $32,000.

Mrs. L. Morrison, two-st'y dwell., 32' x 64', 1518 Washington St.; cost, $15,000.

S. E. Gross, 8 cottages, Washington Ave.; cost, $8,000.

S. E. Gross, 7 cottages, Washington Ave.; cost, $7,700.

S. E. Gross, 5 cottages, 20' x 30' each, Iowa St., near Chicago Ave.; cost, $5,500.

J. H. Cummings, three-st'y dwell., 25' x 70', 519 Dearborn Ave.; cost, $16,000.

S. F. Requa, three-st'y brick flats, 44' x 68', Jackson St., w of Aberdeen St.; cost, $12,000.

J. W. Thomas, 4 two-st'y dwells., 36' x 72', 215 South Hoyne Ave.; cost, $8,000.

J. L. Waller, two-st'y store and flats, 40' x 50', Indiana St., cost, $5,000.

Wm. Waller, 6 two-st'y stores and flats, 50' x 120', Indiana St.; cost, $15,000.

John Dasso, two-st'y flats, 20' x 50', 203 North Union St.; cost, $4,000.

D. Harry Hammer, three-st'y store and flats, 50' x 61', 3734-3738 State St.; cost, $15,000.

H. Menke, two-st'y dwell., 22' x 52', 669 Lincoln St.; cost, $3,000.

H. Popsian, three-st'y flats, 22' x 60', 111 Wade St.; cost, $3,000.

Cincinnati.

BUILDING PERMITS. — Thomas Mead, repair three-st'y brick building, 3 2 West Fourth St.; cost, $2,500.

John Van, two-st'y brick dwell., cor. Brown St. and Marshall Ave.; cost, $15,000.

Wm. Lawler, two-st'y brick dwell., cor. Pine and Tremont Sts.; cost, $2,900.

F. Reynolds, two-st'y brick dwell., 110 York St.; cost, $3,000.

Mrs. M. Hoffmeister, three-st'y brick building, 178 Pearl St.; cost, $6,100.

Miller, Dubrul & Peters Manufacturing Company, five-st'y brick factory, Pearl St., near Ludlow St.; cost, $15,000.

Jos. Becker, two-st'y brick dwell., 107 Loth St.; cost, $3,500.

Ten permits for repairs; cost, $7,500.

Cleveland.

BANK-BUILDING. — Corner Superior and Bank Sts., brick and stone, fire-proof; cost, $175,000; Gordon Lloyd, of Detroit, architect; Robinson & McAllister, contractors.

BOILER-HOUSE. — For the Cleveland Water-Works, 45′ x 85′, smoke-stack, 132′; cost, about $20,000; John Whitelaw, engineer and superintendent; F. C. Bate, architect.

DWELLINGS. — On Prospect St., for Dr. Beckwith, frame and brick dwell.; cost, $13,000; Coburn & Barnum, architects.

On Clinton St., for Jno. Bousfield, a stone double house; cost, $18,000; Coburn & Barnum, architects.

Four dwells. on Sibley St., cor. Cedar Ave., for Price Bros.; cost, $5,000 each; J. M. Blackburn, architect.

Brick dwell., on Summit St.; cost, $9,000; Thos. Linas, contractor; Samuel Lane, architect.

DWELLING AND STORES. — On Superior St.; cost, $6,000; for J. M. Stewart, Esq.; N. P. Charlotte, architect.

RESERVOIR. — For the Cleveland Water-Works, low-service reservoir, on Fairmount, Baldwin and Quincy Streets and Woodland Hills Ave. The capacity will be 70,000,000 gallons; cost, about $900,000; work to be let by the cubic yard; John Whitelaw, engineer and superintendent.

SCHOOL-HOUSES. — Corner of Marion and Sked Sts., brick and stone school-house; cost, $16,000; Jno. Eisenman, architect.

Case School of Applied Science, on Euclid Ave.; cost, $175,000; Thos. Linas, contractor; Jno. Eisenman, architect.

ALTERATIONS to dwell. on Clinton St., for James Sprankle; cost, $4,000; Jno. S. Watterson, contractor; F. C. Bate, architect.

Denver, Col.

BUILDING PERMITS. — During May, the Building Inspector of this city granted permits for the erection of 69 buildings, aggregating in cost $202,485.

W. C. Lothrop was granted a "special permit by the Council," to erect a three-st'y brick block, 90′ x 100′; cost, $50,000; E. P. Brink, architect; A. J. Kelley, builder, situated cor. Lawrence and Eighteenth Sts.

Kerstens & Peters, two-st'y brick building, stone basement, 35′ x 55′; cost, $8,000; Broadway, between Pine and Deer Sts.; Wm. Quayle, architect; J. C. Dowling, builder.

W. G. Sprague, two-st'y and basement brick residence, 25′ x 65′; cost, $7,500; Champa St., between Thirteenth and Fourteenth Sts.; J. H. Littlefield, architect.

J. G. Thatcher, two-st'y brick dwell., with stone basement, 46′ x 60′; cost, $10,500; Sherman Ave., between East Sixteenth St. and Colfax Ave.; F. E. Edbrooke & Co., architects; Buell & Buell, builders.

Detroit.

BUILDING PERMITS. — E. H. Candler, brick house, Fourth St.; cost, $2,500.

Wm. Scott & Co., addition to stove-works, Jefferson Ave.; cost, $8,000.

G. W. Vinton & Co., brick house, Cass Ave., No. 405; cost, $11,000.

E. S. Moore, frame house, 40 Brainard St.; cost, $2,800.

Peter Dederichs, 5 brick stores, Nos. 122 to 130 Gratiot Ave.; cost, $28,000.

S. E. Smith, frame house, Pine St.; cost, $3,500.

W. G. Vinton & Co., addition to brick house, Charlotte St.; cost, $3,500.

A. J. Smith, frame house, No. 852 Cass Ave.; cost, $3,000.

Alex. Hamilton, frame house, 305 Fifth St.; cost, $3,500.

John La More, frame house, Fourteenth St.; cost, $4,100.

Lloyd, Llewellyn & Co., repairs to store, Jefferson Ave.; cost, $7,000.

E. A. Walshe, brick house, Watson St.; cost, $6,000.

R. Helson, brick house, Woodward Ave.; cost, $11,500.

Julius Hess, additions to factory, McDougall Ave.; cost, $15,000.

Jersey City.

BUILDING PERMITS. — J. McWilliams, owner, frame building, 50′ x 100′, at foot of Morris St.

Adams Express Co., owner, frame building, 100′ x 200′, 158 to 164 Bright St. and 355 to 361 York St.

M. Roberts, builder, frame building, 20′ x 75′, 91 Bright St.

J. Gormam, owner, frame building, 25′ x 38′, 69 Hudson St.

Fox & Drummond, owners, frame building, 20′ x 40′.

D. Mulqueeney, owner, frame building, 20′ x 30′, 27 Twelfth St.

New York.

APARTMENT-HOUSES seem to continue to be the favorite speculation in building, and among those now being planned are: —

Eight, brick and stone, 25′ x 80′ each, five stories high, to be built on the cor. of Ninety-eighth St. and Second Ave., for Mr. Chas. White, from designs of Mr. Chas. Baxter; to cost $160,000.

Two five-st'y, 33′ x 96′ and 34′ x 88′, to be erected on the s e cor. of Eighth Ave. and Fifty-fifth St., for Messrs. Loew Bros., from designs of Messrs. Thom & Wilson.

Seven brownstone, three stories and basement, to be built on the south side of Seventy-second St., w of Second Ave., for Mr. Jas. Fettretch; Messrs. Cleverdon & Putzel, architects; cost, about $100,000.

Ten-st'y brick and stone, to be built on One Hundred and Twenty-third St., cor. St. Nicholas and Eighth Aves., with a frontage of 152′ on One Hundred and Twenty-third St.; Mr. R. Wilson, owner; Mr. D. T. Atwood, architect; cost, about $150,000.

Four five-st'y brick, 25′ x 65′ each, to be built on the n w cor. of Second Ave. and Ninety-eighth St., for Mr. Wm. Hall; to cost $60,000; Mr. J. H. Valentine, architect.

Two brick, to be built at Nos. 285 and 287 West Sixtieth St., for Mary J. Largan, from designs of Mr. S. W. Prodgers.

CHURCH. — The Broadway Methodist Episcopal Society proposes to erect a church on the n e cor. of the Boulevard and Sixty-ninth St.

HOUSES. — Three double houses, with frontages of 44′, are to be built on One Hundred and Thirtieth St., between Cliff and Ninth Aves., from designs of Mr. Wm. Schickel, for the Sisters of the Convent of the Sacred Heart.

Eight houses, 25′ x 65′ each, are to be built for Mr. George Kuhn, on the north side of Sixty-seventh St., 200′ w of Eleventh Ave.

BUILDING PERMITS. — *Tenth Ave., Nos.* 543 *and* 545, five-st'y brick tenements and stores, tin roofs; cost, $30,000; owner, Henry A. Childs, 219 West Forty-Second St., and others; architect, Daniel Burgess.

Greenwich St., e s, from Vestry St. to Debrosses St., seven-st'y brick store, tin roof; cost, $200,000; owners, Trinity Church Corporation, S. V. Cruger, comptroller, 5 Church St.; architect, Charles C. Haight; builders, Masterton & Stevenson and Lewis H. Williams.

Sixty-first St., s s, 125′ w Tenth Ave., 5 five-st'y brownstone front tenements, tin roofs; cost, each, $23,000; owner, John Richards, 1½ Rector St.; architect, C. F. Ridder, Jr.

West Fifty-fourth St., No. 132, three-st'y brick stable, gravel roof; cost, $9,000; owner, Wm. B. Ross, 60 East Twenty-first St.; architect, L. N. Crow.

West One Hundred and Twenty-fifth St., Nos. 108 *and* 110, four-st'y brick flat and store, tin roof; owner, E. H. M. Just, 35 Great Jones St.; architect, M. E. Merritt.

Third Ave., e s, cor. One Hundred and Sixty-eighth St., two-st'y brick office, tin roof; cost, $3,000; owner, David Mayer, 1304 Fifth Ave.; architects, H. J. Schwarzman & Co.; builders, List & Lennon and T. J. Duffy.

Seventy-fifth St., n s, 150′ w Fourth Ave., 3 four-st'y brownstone front dwells., tin roofs; cost, each, $[illegible],000; owners and architects, Samuel D. Bussell, 106 East Thirty-first St., and Joseph B. Wray, 218 East Thirty-second St.

Sixty-first St., s s, 350′ w Tenth Ave., 2 five-st'y brownstone front tenements, tin roofs; cost, each, $18,000; owner, James Philp, 1667 Broadway; architect, J. O'Rourke; builders, Stone & Healey.

Eighty-fifth St., n s, 200′ w First Ave., five-st'y brownstone front tenement, tin roof; cost, $16,000; owner, Jacob L. Maschke, 21 Delancey St.; architect, John C. Burne.

East One Hundred and Twenty-fourth St., No. 77, three-st'y and basement brownstone front dwell., tin roof; cost, $12,000; owner, Chas. Welde, 413 East One Hundred and Twenty-fourth St.; architects, Babcock & McAvoy; mason, Benj. Weeks.

Elizabeth St., No. 30, rear, two and part three st'y brick stable, gravel or tin roof; cost, $6,000; owner, John Maesel, on premises; architect, Wm. Jose.

West Sixteenth St., Nos. 410, 412 *and* 414, one-st'y brick warehouse and ale vault, gravel composition roof; cost, $22,000; owner, Thos. McMullen, 26 West Thirty-third St.; architect, Augustus Hatfield.

East Eighty-first St., Nos. 210 *and* 212, 2 five-st'y brick tenements, tin roofs; cost, each, $16,000; owner, Peter Seebald, 1314 Lexington Ave.; architect, John Brandt.

Courtland Ave., w s, 25′ s One Hundred and Forty-ninth St., four-st'y brick tenement and store, tin roof; cost, $12,000; owner, Bernard Joost, 603 East One Hundred and Thirty-fifth St.; architect, Frank E. Verder.

First Ave., No. 171, five-st'y brick with iron front store, tin roof; cost, $18,000; owners, R. & O. Goelet, 261 Broadway; architect, Jos. M. Dunn; mason, Michael Reid.

Sixty-ninth St., n s, 125′ w Tenth Ave., two-st'y and basement brick dwell., tin roof; cost, $6,000; owner, Harriet L. Potter, 507 West Sixty-ninth St.; architect, Andrew Spence.

Ninety-fourth St., e s, 125′ w Second Ave., ten buildings; *Ninety-third St.*, n s, 125′ w Second Ave., six buildings, 16 five-st'y brick tenements, tin roofs; cost, each, $15,000; owner, Michael Duffy, 156 East One Hundred and Second St.; architect, Andrew Spence.

Sixty-first St., s w cor. Madison Ave., 5 four-st'y brownstone front dwells., tin roofs; cost, total, $171,000; owners, architects and builders, Chas. Buek & Co., 63 East Forty-first St.

Third Ave., Nos. 1578 *and* 1580, 2 five-st'y brick flats and stores, tin roofs; cost, each, $19,000; owners, Emily C. Watson and Laura B. Rhinelander, by Chas. E. Rhinelander, attorney, 105 East Eighteenth St.; architect, Geo. B. Post; builders, Peter Tostevin's Sons and Peter Loonan.

Broome St., n e cor. Wooster St., six-st'y brick store, tin roof; cost, $49,000; owner, Henry C. Thatcher, Yarmouth, Mass.; architect, John F. McIntyre; builders, Alex. Brown, Jr., and John F. Moore.

Eighty-sixth St., s s, 330′ w Third Ave., 2 five-st'y brick flats, tin roofs; cost, each, $25,000; owner, Wm. J. Gessner, 1722 Madison Ave.; architects, Thom & Wilson; done by days' work.

Eighty-sixth St., s s, 358′ 10″ w Third Ave., five-st'y brick flat, tin roof; cost, $19,000; owner, architects, etc., same as last.

Brook Ave., e s, 50′ n One Hundred and Forty-fourth St., 3 two-st'y frame dwells., tin roofs; cost, each, $2,500; owner and builder, Thos. H. Keely, 1238 Second Ave.

West Fifteenth St., No. 30, four-st'y brick dwell., tin roof; cost, $14,000; owner, Cornelia Burrows, by Edward Mitchell, agent, 45 West Fifty-fifth St.; architect, Chas. E. Hadden.

East Eighty-second St., Nos. 233 *and* 235, 2 five-st'y brownstone front tenements, tin roofs; cost, each, $18,000; owner, Eva Muller, 446 East Seventy-sixth St.; architect, John Brandt.

Eighty-eighth St., n s, 210′ e Third Ave., 4 five-st'y brownstone front tenements, tin roofs; cost, each, 17,500; owner, Jno. J. MacDonald, 1321 Park Ave.; architect, John Brandt.

One Hundred and Forty-fifth St., s s, 175′ w St. Ann's Ave., three-st'y frame tenement, tin roof; cost, $4,500; owner, Dennis Mannion, 281 Eleventh Ave.; builder, John Jordan.

Broadway, e e cor. Twenty-second St., five-st'y brick store, slate and tin roof; cost, $200,000; owner, Wm. Jay, et al., trustees, 48 Wall St.; architect, Chas. C. Haight; builders, Robinson & Wallace.

Third Ave., e s, 25′ n Sixty-second St., four-st'y brick and brownstone flat, tin roof; cost, $16,000; owner, Mrs. Elizabeth A. Albert, Hillsdale, N. Y.; architects, C. W. Romeyn & Co.; builders, J. & G. Ruddell.

Eighty-sixth St., n s, 257′ w Ave. A, 4 five-st'y brownstone front tenements, tin roofs; cost, $25,000; owner, Wm. Henderson, 511 East Eighty-second St.; architect, John C. Burne.

West Fifty-eighth St., No. 156, four-st'y brownstone front dwell., tin roof; cost, $30,000; owner, John Coar, 128 West Fifty-eighth St.; architects, Thom & Wilson; days' work.

One Hundred and Thirty-second St., n s, 150′ e Eighth Ave., 5 three-st'y brownstone front dwells., tin roofs; cost, each, $15,000; owner, Robert Lindsey, 2325 First Ave.; architect, J. H. Valentine; builder, John Hutchison.

ALTERATIONS. — *Maiden Lane, No.* 88, raise one-st'y, front wall rebuilt, and internal alterations; cost, $8,000; owner, Edward H. Kellog, 17 Cedar St.; architect, G. A. Schillinger.

Thirty-sixth St., n s, 150′ e Second Ave., raise one-st'y; cost, $12,000; owner, St. Gabriel's Church, Rev. Wm. H. Clowry, pastor; architect, Jos. M. Dunn; builders, Sanderson & Son and Jno. Murphy.

East Fifty-eighth St., No. 46, three-st'y and basement brick extension; cost, $10,000; owner, James D. Fish, 78 Broadway; architect, Ed. H. Kendall; builders, Warren A. Conover and A. G. Bogert & Bro.

Philadelphia.

ADDITION. — *Belmont Ave.*, cor. Girard Ave., addition to "Home for Aged and Infirm Colored Persons," south wing 22′ x 57′, to be four stories, and fire-proof; Addison Hutton, architect.

CHURCHES. — The congregation of the Hebron Baptist Church propose to erect a church-building at Fifty-sixth St., cor. Vine St., to cost $60,000.

The First Reformed Church Congregation, having purchased a lot at Tenth St., cor. Wallace St., propose to erect thereon a church-building, 54′ x 107′, to be built of Chester gray stone.

BUILDING PERMITS. — *Forty-first St., No.* 505, three-st'y dwell., 21′ x 60′; Wm. M. Schenke.

Thirty-third St., s w cor. Haverford St., 6 two-st'y dwells., 16′ x 45′; Samuel Haag, contractor.

Twenty second St., n w cor. Master St., two-st'y factory, 14′ x 58′; D. Nunneviller, contractor.

Sixty-first St., s e cor. Lombard St., 2 two-st'y dwells., one with store, 20′ x 32′; Harry Pettit, contractor.

Vine St., n s, e of Fifty-fifth St., three-st'y store and dwell., 18′ x 44′; Harry Pettit, contractor.

Edgemont St., w s, n of Somerset St., two-st'y dwell., 30′ x 31′; Jno. Mitchell.

Orkney St., e s, n of Indiana Ave., two-st'y weave-shop, 32′ x 32′; Jas. W. Hampson, owner.

East Orthodox St., No. 250, two-st'y store, 16′ x 40′; Briggs & Bro., owners.

Twenty-ninth St., w s, s of Dauphin St., three-st'y dwell., 14′ x 35′; L. Paul, owner.

Silverton Ave., n s, 13 two-st'y dwells., 16′ x 42′, and *Atlanta St.*, s s, w from Thirty-eighth St., 15 two-st'y dwells., 14′ x 37′; F. L. Michaelson, owner.

Allegheny Ave., s s, e of Fisher St., three-st'y dwell., 16′ x 50′; Sebastian Heim, contractor.

Frankford Road, No. 1542, three-st'y store and dwell., 16′ x 73′; Thos. E. Day, contractor.

Esher St., w s, n of Thompson St., 6 two-st'y dwells., 14′ x 36′; Jos. Sutton, contractor.

Ninth St., cor. York St., three-st'y dwell., 17′ x 52′, and three-st'y store, 16′ x 42′; Jno. Klebe, contractor.

Ripka Ave., n w s, above Washington St., three-st'y dwell., 17′ x 48′; Sturges & Heath, contractors.

Ripka Ave., s e s, between Hamilton and Mansion Aves., two-st'y dwell., 18′ x 40′; Sturges & Heath, contractors.

Green Lane, s e s, between Spring and Magnet Sts., three-st'y dwell., 17′ x 48′; Sturges & Heath, contractors.

Jefferson St., s e s, above Linden St., 2 two-st'y dwells., 17′ x 48′; Sturges & Heath, contractors.

West Huntingdon St., No. 162, two-st'y dwell., 14′ x 30′; Jacob Ebner, contractor.

Linden St., n e s, s e of Jefferson St., 2 two-st'y dwells., 18′ x 45′; Wm. Eddleman, contractor.

Fairhill St., w s, s of Huntingdon St., two-st'y shoe-shop, 16′ x 40′; Wm. Tecklenberg, contractor.

Twenty-fifth St., w s, s of Oxford St., 3 three-st'y dwells., 15′ x 52′; Jno. L. Carre, owner.

Van Pelt St., n e cor. Berks St., 6 three-st'y dwells., 16′ x 48′; J. L. Carre, owner.

Boudinot St., w s, between Somerset St. and Kensington Ave., three-st'y dwell., 16′ x 42′; Jno. Cunningham, contractor.

Belgrade St., w s, n of Capewell St., two-st'y dwell. and two-st'y shop; 17′ x 38′; J. S. Baldt, owner.

Kimball St., n s, w of Twenty-first St., 6 two-st'y dwells., 14′ x 27′; Robert Kaighn, contractor.

Salmon St., No. 1617, two-st'y dwell., 16′ x 32′; W. Chard, owner.

Tenth St., cor. Lemon St., 5 three-st'y dwells., two 17′ x 55′, three 14′ x 24′; Samuel Hart, contractor.

Tulum St., s e cor. Kipp St., two-st'y dwell., 14′ x 28′; Thos. Badman, owner.

Locust St., below Sixteenth St., four-st'y dwell., 60′ x 60′; Benj. Ketcham & Son, contractors.

Huntingdon St., e of Trenton Ave., three-st'y addition, 70′ x 70′; Chas. Judge, contractor.

Christian St., e of Twenty-fourth St., 2 two-st'y dwells., 15′ x 46′; Chas. Lafferty, owner.

Warren St., Nos. 3904, 3906, 3908 *and* 3910, 4 two-st'y dwells., 14′ x 40′; Hartman Graw.

Philadelphia Almshouse, boiler-house, 52′ x 67′; G. L. Harvey, contractor.

North Fifth St., No 2557, two-st'y warehouse, 18′ x 32′; F. Hefling, contractor.

Amber St., n of Huntingdon St., 2 two-st'y dwells., 15′ x 34′; J. McSorley, owner.

Gorgas Lane, between Main and Chew Sts., 2 three-st'y dwells., 18′ x 48′; Martin Hetzel, contractor.

Cherry St., s e cor. Margaretta St., three-st'y store and dwell., 16′ x 44′; A. H. Taylor, contractor.

Frankford Road, cor. Adaline St., 4 two-st'y dwells., 15′ x 42′; A. H. Taylor, contractor.

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THE prosperity of the building trades in New York seems to have been favorable to the development of the various associations of workmen, which, although their movements are less prominently brought to the notice of the public than in duller times, when their activity takes the character of a struggle for existence, find a sufficient field of effort in endeavoring to promote the interests of their members in other ways. One of the strongest of these associations, the Plasterer's Union, has recently undertaken a work which, while it shows in a singular manner the extent of the authority delegated to the managers of such bodies, is nevertheless of interest as indicating a disposition on their part to take a higher and more conscientious view of their duties than they have generally had the credit of holding. Having become convinced in some way of the important but neglected truth, that all bad handiwork injures in the end both the person who is guilty of it and the profession to which he belongs, the officers of the New York Plasterers' Union, with a decision, not to say an indifference to other people's wishes, which is curiously characteristic of such societies, now employ regular inspectors, representing the Union, who watch all the plastering work going on in the city, and compel its execution in accordance with the regulations of the trade, employing the usual means of coercion in case of disobedience. Of course, one of the regulations which the inspectors enforce is that common to all trade societies, that no man shall do more than a certain amount of work in a day; but there are others, requiring a certain quality of work and materials, which are carried out with equal vigor, and which certainly deserve the approbation even of those to whom the limitation of industry seems objectionable.

THE avowed intention of these technical regulations is to make the quality of plastering work uniformly good in all cases, quite irrespective of the price which the contractor who pays for it may have agreed to do it for, as some of the latter have found to their serious inconvenience. Among other things, the Union forbids the doing of two-coat work within the city under any circumstances, not only prohibiting its members from executing such work, but compelling them to withdraw from any building in which it may, by any possibility, be done by others. This regulation is of considerable importance to the cheap builders, who have been accustomed to plaster with two coats in closets and other places out of the way, but find themselves now obliged to put in and pay for the best three-coat work everywhere, under pain of being reported by the inspector, and seeing themselves deserted by all their plasterers in a body. It is useless to resist the decrees of the Union; no one else can be had to do the work, and a contumacious contractor is soon forced into submission. The same sharp discipline which is dealt out to the builders is also applied to the members of the Union itself; and any plasterer detected in bad, careless or ignorant work is reported and fined. Even the poor laborers who mix the mortar, although not subject to the jurisdiction of the plasterers' association, are indirectly reached, the inspector watching the proportions and quality of the various materials, and forbidding his men to use mortar not made to his mind. Whether these rather high-handed proceedings would be countenanced by law if any serious controversy should arise, may be doubtful, but living as we do in the midst of universal inferiority in manual workmanship, it is gratifying to see so vigorous an effort made to restore the character of even a single trade.

THE New York *Tribune* gives an account of Mr. Richard M. Hunt's design for the pedestal for the great statue of Liberty, from which it appears that a very striking and ambitious scheme is in contemplation. As our readers know, the statue is to stand in the middle of a small star redoubt called Fort Wood. The exterior of the redoubt is to be filled with earth, level with the top of the ramparts, and covered with grass, the outline of which will be defined by a granite coping. From the middle of this formal mass of green will rise a pyramidal structure, faced with polished ashlar, and containing four external staircases, which occupy the middle of the sides. The pyramidal portion, which is only about twenty-five feet high, terminates in a platform, from which four doorways open into the interior of the monument, through the middle of the sides of a plinth, some twenty feet high, with nearly vertical sides, adorned with the carved escutcheons of the various states of the Union. Above this plinth, and separated from it by a decorated band, comes a stage, about fifty feet high, of plain masonry, heavily rusticated, and this again is surmounted by a huge Tuscan colonnade, carrying a gallery, and richly decorated with large and effective ornaments, which forms the base of the great statue. The whole pedestal is about one hundred and fifty feet high, and it certainly promises, if Mr. Hunt's design is carried out, to possess an interest little, if at all, inferior to that of the sculptor's creation which it supports.

THE *Builder* recently indulged in some reflections on the subject of carriage entrances, as arranged in Parisian houses, which are quite worthy of attention. Very few of our architects, and still fewer persons of other professions, understand the value of this feature in giving dignity and importance to an elevation as well as a plan, and as a consequence many opportunities for the display of architectural magnificence, which would be eagerly seized, and adroitly used, by a French architect, are in this country thrown away. In fact, the whole subject of dignified domestic architecture needs serious study among the profession here. The increase of wealth and expenditure has been so great that scores of houses are now built every year in New York, Boston, Philadelphia and other cities which would, so far as cost is concerned, be classed in any other country as palaces, just as their owners would rank among princes to the extent that money and luxury can give such distinction; but these structures, so far from presenting any grandeur or stateliness of aspect, generally have an air of inflated mediocrity, like a hotel rather than the appropriate shelter of that complex organism of service and responsibility which even here goes to make up a large establishment. With all our democratic ways, there is no need of planning great houses, as we often find them, in which hundreds of visitors and guests are entertained every week, with exactly the same provisions for receiving them that would be furnished in the cottage of a mill-operative, with the difference that everything in the mansion would be on a larger scale. On the occasion of a reception or ball, the friends of the owners of houses on which millions of dollars have been spent are generally expected to land from their carriages on the sidewalk, to be welcomed by a gibing crowd of ruffians, restrained by one or two policemen from pressing upon the dirty little strip of carpet which leads up a steep flight of steps to the scene of the festivities, which proclaim themselves to the hearing and sight of all the passers-by, in a manner quite destructive of dignity.

COMMON as this disposition is to large houses in London as well as in our own cities, we imagine that there are few persons who cannot see the advantage of the French plan, by which the guests of the house, instead of landing on the sidewalk, are brought directly into the court-yard, where they are received, if not by their hosts themselves, at least by their servants, instead of a dirty mob, and take their leave in the same way, without fear of annoyance from the rudeness of strangers. Such distinction as the carriage entrance and court-yard give are easily obtained, even in a house built with strict economy in regard to the amount of ground covered; but where the owner of the mansion can afford the cost, a great increase of dignity can be obtained in buildings placed *entre cour et jardin*, the street front being formed by a low structure, con-

taining the rooms of the concierge and other servants, with the carriage entrance in the centre, flanked sometimes by two projecting wings of the main house, which are brought forward to the street. These, with the low structure on the street, enclose the court-yard, beyond which is the higher portion of the building, containing the state entrance and the grand saloons, which extend across the whole width of the lot; and behind this portion, whose façade gains greatly in distinction by its haughty withdrawal from the public thoroughfare, is the garden, which is entirely concealed from the view of any one except the inhabitants of the house, and is often brought into very close connection with this, as a sort of open-air parlor. Every architect can see the admirable way in which this arrangement lends itself to stately and convenient distribution of rooms, as well as to perfect light and ventilation, and although a house so planned would not be cheap, there are many people now who would be both able and willing to pay for the advantages which it would possess, if they were once pointed out to them.

THE character of modern Parisian building is well illustrated by some statistics given in the *Builder*. According to these there were built in Paris in the two years 1881–1882 three thousand two hundred and fifty-three houses, with eight hundred and forty-six subsidiary buildings, the whole containing thirty-four thousand separate dwellings, or about ten to each building. Even with the universal clustering of households in these "*magasins de famille*," as Viollet-le-Duc, who had no liking for such a mode of living, was accustomed to call them, rentals in Paris have risen to a very great height. Suites of five rooms in the topmost stories of houses in a respectable neighborhood now bring six hundred dollars a year, and the prices of apartments generally have nearly doubled within three years. Curiously enough, this great advance is attributed in part to the construction of the vast and splendid buildings which have brought ruin upon so many builders' syndicates of late. These houses, although they have proved but a bad investment, are built in such a costly manner that rooms in them must bring an extravagant rent to return anything like interest on the capital which they represent; and the rates which were unremunerative to their owners have set the standard for similar, but inferior accommodations in the older buildings. In the light of this experience, it will be interesting to see whether the huge apartment-houses now building in the fashionable quarters of New York will have a similar effect upon rentals of tenements in more modest quarters.

CERTAIN recent excavations in Paris have exposed the remains of an extensive amphitheatre, dating from the Roman period, occupying the ground about the corner of the Rue Monge and the Rue de Navarre, in the most crowded part of the city. Already the ruins of the aqueduct which brought water to the building have been discovered, with a fragment of the podium wall which surrounded the arena, two of the division walls which supported the ranges of seats, and a part of the colonnade belonging to the stage. The character of the masonry indicates that the building belongs to the second century of our era, which would make it the most ancient ruin in Paris, with the exception, perhaps, of parts of the wall enclosing the Seine, and about two hundred years older than the fragments of Julian's palace adjoining the Hôtel Cluny. At a little distance from the portion of the amphitheatre first discovered were found the remains of an arched passage, leading toward the building from the side of the Rue de Navarre; and connected with these was another fragment of the podium wall. The stones showed signs of burning, as if the building had been destroyed by fire, and the masses of masonry had evidently served as a quarry for the neighboring villages for centuries afterward. It is probable that the two disconnected ruins now exposed are all that remain of the building, but an effort will be made to preserve them intact.

THE giant trees of California, which have been one of the wonders of the world ever since their discovery, some twenty-five or thirty years ago, are now found to be far surpassed by certain specimens of the eucalyptus found in the mountains of southeastern Australia. The highest tree at present standing in the groves of Mariposa County is three hundred and twenty-five feet high, and this is only the largest out of a small number of specimens of a tree found nowhere else, while the Australian forests contain many thousands of greater height than this, one of them, the tallest yet measured, being four hundred and seventy-one feet from the ground to the summit. The diameter at the base of this enormous plant is eighty-one feet, so that if it should ever be cut down, a squadron of cavalry might go through its evolutions on the stump, in place of the modest quadrille which it has given so much pleasure to the Californians to dance upon the truncated fragment of one of their great sequoias. As in California, the largest of the Australian trees are no longer standing, and a prostrate trunk has been found which measured four hundred and thirty-five feet from the roots to the place where the upper portion had been broken off by the fall. The broken tip had disappeared, but as the diameter of the trunk at the point of fracture was three feet, it is estimated, with great probability, that this indicates an additional length, for the perfect tree, of at least seventy feet, making the whole height of the plant more than five hundred feet. Concerning the time required for developing from a very minute seed a tree which would overlook the Great Pyramid, no inquiry has been made, and as the evidence of the so-called annual rings is now known to be worthless for determining this point, we may never be able to form even an approximate estimate of the age of these giants, but the common eucalyptus has been observed to grow from seed to a height of sixty feet in ten years, and it is quite probable that a few centuries have sufficed to bring specimens planted in a favorable soil to their full development.

UP to the present time the balance of strength between the appliances of offensive and defensive warfare has been turning slowly in favor of the former. The Romans, it is true, found no fortifications among their enemies which they, with their towers and engines, could not in time break through; but their successors in mediæval times, who had much more occasion than they to study the art of protecting themselves from their enemies, soon learned how to build castles which would resist indefinitely the best military science of the age, unless betrayed by treachery, or surprised in an unguarded moment. Such castles as these, which the royal armies of France and England often besieged for years without success, were of course impregnable by any feebler force, and Europe, at least, would probably be to this day divided between plundering barons and wretched slaves, if the beneficent invention of gunpowder had not given the serfs the means of bringing their masters to reason, by knocking down over their heads the towers and battlements which had for so many ages enabled them to defy human justice. In the hands of the great military engineers of the seventeenth and eighteenth centuries the art of fortification consisted rather in the skilful combination of defensive works to delay the advance of an enemy, than in the attempt to construct isolated buildings of great strength; and as the range and effectiveness of artillery has improved, the opportunities for resisting it by rampart sand walls have diminished, until a great armored ship, like the one recently constructed for the Italian Government, which can sail, driven by engines of eighteen thousand horse-power, at a rate of nearly twenty miles an hour in any direction, and, itself protected from the effect of any artillery yet made by a steel plating nineteen inches thick, can concentrate ten thousand pounds of iron at a single discharge upon any given spot, would find few fortified seaports in the world which it could not ravage with impunity.

ALTHOUGH few of our readers are likely to have occasion to build forts, it will not be amiss for them to know how such works of defense are to be constructed. According to a recent report of the United States Board of Engineers for Fortifications as quoted in the *Scientific American*, it is probable that in future the stronger fortresses, like the great ships of war of the present day, will be furnished with iron turrets, protected by armor of sufficient strength to resist the impact of any known projectile. It is unnecessary to say that the stone and brick forts of our ancestors are hardly of more use than shells of boards for defending persons within them against the attack of modern artillery, and it seems that the heaviest plates of cast steel and iron are little better, either material breaking to pieces under the blow of a two-thousand-pound cannon-ball. Wrought-iron, however, and hammered steel, are tough enough to resist the shock without breaking; and as the report of the Engineer officers says, the latter, used in plates twenty inches or more in thickness, may be the material so long sought, that will resist with certainty the offensive weapons to which modern science has given such terrible power.

AMERICAN ARCHITECTURAL FORM OF THE FUTURE.

"Ring out the old, ring in the new,
Ring out the false, ring in the true."

"Hold fast to that which is good."

IT seems to me, the more I look at this subject, the more it expands in every direction, and the difficulties in the way increase *pro rata* of the expansion. There is one fact not generally conceded by the architect and artist, yet it is an eternal fact, — our main hope for future success hangs thereon—it is this: that the natural human mind in the civilized world, if left unencumbered by expert (?) advice, without knowing the books, judges any art effort *correctly every time.* Not long ago a little four-year-old showed me a Christmas book of kitten pictures, and on every new page the little forefinger would go down on some particular kitten's head, and her face turn up at me with a most gleeful laugh. That one of the kittens always proved to have a vigorous, spirited expression, while the rest were regulation kittens. The baby picked out the right one every time. I have observed the same thing in many instances, in young and old, and am satisfied there is a natural affinity between the unsophisticated mind and truth.

In reality our enemy is our "artist" (sometimes he can't *draw*, sometimes he can sketch), our man of taste, cultivated taste, travelled taste, who picked up all the vices along his path — the virtues he passed, these were too tame to interest him; it is the young artist who came by the royal road to fame — the old way was too laborious for him, hence he ignores or belittles what he does not know how to do, or is too indolent to do it; it is the figure-painter, who does not need anatomy, or the landscape-painter, linear perspective, not one of whom will be remembered twenty years after his death, linked together with the dealer, the manufacturer, the man of business, — these are the fountains of public taste, together with the merchant-tailor, the milliner, the upholsterer; and how could *they* thrive if a suit of clothes were in style till it be worn out? Hence the longevity of a fashion is not coeval with the wear of a bonnet. There being money in this transaction, they can afford to educate the public mind up to admiring and buying their magnificently artistic goods. Ten years ago a sewing-machine, prime cost $13.50, could not be got into a house for less than $60; a twenty-inch wall-paper centre, prime cost five cents, retailed at fifty cents, and everything artistic in the same way. Considering this we can see how much the trade could afford for educational purposes, in the shape of commissions, brass band, posters and fancy catalogues. Thus our country has been educated in our art taste. The country survived because of its wonderful productive force, but art suffered by the transaction.

Darley's "Margaret," "Sleepy Hollow" and "Rip Van Winkle" became antiquated and "Symphonies in Payne's gray," etc., followed. I have seen Greek statues by "famous" artists somewhere between ten and twelve heads high. When we find architects able and willing to risk an absolute outlay of, say, $10,000 on a superb set of drawings for a competition and when we see some of these men lose as many, or more competitions, than they gain, and not get poor by the transaction, there is, apparently, a screw loose somewhere, and were it not for the eternal fact before referred to, our case would be hopelessly bemired indeed. But right will eventually prevail and all this charlatanism with its evanescent glory will some day pass into oblivion.

In the outset, let this fact be indelibly impressed on our minds, that our possible success will never reach farther up, or down, than the extent of our *positive* knowledge; it will ever be like water, always finding its own level; hence the importance of a continual striving for an increase of exact knowledge of every kind. Our artistic architectural form in order to command respect must be æsthetic, intellectual, original and homogeneous; it must be neither bought, borrowed nor stolen, and hence some very difficult questions are awaiting answer this side of the starting-point.

How can anything grow naturally in such a whirlwind, where we move forward at the rate of sixty miles an hour? What form or character will result from the boiling down of our heterogeneous population, made up as it is of the American, (Yankee and Tarheel, Buckeye and Cracker, the Gopher and the Sucker, the Hoosier and the Wolverine), the Irish, English, Dutch, German, French, Russian, Italian and what not?

We have nearly all the climatic conditions of the habitable globe and about all their religions from way up yonder down to none at all. Here are all imaginable antagonisms combined, physical, mental, intellectual and moral, and yet we are a nation, a unit before the outside world, and as such possess a distinctive character. What is it? Who can crystallize this "what is it" into tangible form? Let us not despair, though our problem now is greater and more difficult than it was among other people; they simply let it alone and it came of itself; "it growed." That experiment with us resulted, I fear, in "growing to weeds;" at least what is not weeds appears to be transplanted from across the sea.

Now the most expressive architectural form is decorative ornament, and this is gradually vanishing from among us, for of late years the "picturesque" style—reflecting, however, rather the character of the sturdy pilgrim or the Manhattan burgomaster of old, than ours of to-day—is coming into vogue. At best it is but like the music of an æolian harp as compared with an operatic orchestra. We shall get little or no practice in ornament unless a new leaf is turned over in the public sentiment about that "current barbarism known as good taste," which now commands that everything be plain. The cause of this is: first, the unfortunate everlasting demand for a continual change, for worse or for better, but change anyway; second, it began to be felt that we had about exhausted the ornament of the past of all countries, *i.e.*, what we could comprehend of them, and the propriety of making something of our own didn't occur to us, so we went and threw the whole business overboard and satisfied ourselves for a while with "crankifying" the work of English people of quality. Now we don't exactly know where we are nor what to do next. Since good ornament is very expensive, if wrought in genuine materials, I would suggest the propriety of easing off from the time-honored and correct practice of making everything genuine, for the following reasons: our ordinary building in this country is pulled down and rebuilt about every forty years; besides, commonly, we are too poor in artistic skill as well as in money to build anything now that will stand the test of time. But let me be understood: where we have money enough at command, I would stick to the old doctrine of having everything genuine to the last item.

"A thing of beauty is a joy forever." That most beautiful of things the *flèche* of the St. Chappelle, Paris, and probably the most beautiful tower, that of St. Jacques, are so by reason of their beautiful proportions, and the subtile refinement and thought, together with the harmonious distribution of their most elaborate decorations. Here all is hewn in stone,[1] and the world will never again see their duplicate; for a man with the necessary art-love and art-discrimination to build such works will never have money enough to do it: there are one hundred thousand more chances of his being struck by lightning. A barren stone spire, though solid and everlasting, never made a pleasing impression on my mind, while the beautiful paintings of Fortuny's minarets, though in water-color, the frailest thing imaginable, stick to my memory with an astonishing vividness. Under these conditions the question arises, shall we not, *pro tem*, make a compromise with this eternal-duration business, and be satisfied with materials which, though not everlasting, are still good for forty years or more, and cheap enough for us to use lavishly. We might, under these conditions, produce works which, though seen but once, would always be remembered with pleasure. A chance would be afforded to multiply interesting forms, and children would see and remember them when they grow up as parts of the "dear old home," house or city. I believe in highly elaborate, even gorgeous decorations in their proper place, but they must be subtile, full of thought and meaning, beautiful in form and vigorous expression. The outcome of the fact that ours is not an heroic age, but one of subtile, vigorous thought and utilitarianism, will naturally give us a quiet sky-line (except in the monumental buildings, here we are heroic as ever), a severe façade, scarcely symmetrical, for there is such a variety of uses to be provided for, and the ornamental must give precedence to the useful; hence our decorative form would scatter itself rather among the details. Our cornices, panels, mouldings, capitals, pilaster-heads, brackets, etc., should be elaborately decorated with sharp, vigorous, subtile and refined forms and lines, full of thought and well-expressed meaning, for there is so much of interest passes before us every hour of the day that we are almost nauseated with spicy things, and unless a thing is very full and deep we hardly give it a single glance, or a moment's thought. In the above sense, the more elaborate the decoration the higher it grades, for the artist (I mean a man of brains and learning) stops when he gets done. The starry firmament is a much grander spectacle than Venus, beautiful as she is. Cast-iron and cast-zinc are capable of much more in artistic decorative form than has been reached yet, and the sky-line of the St. Chappelle, together with the beautiful delicacy of its finials, crockets, gargoyles, tracery, etc., would be quite possible, with a reasonable amount of money, built in timber, covered with strong galvanized-iron, and decorated with cast-zinc. What if it did not last forever? Nothing except bronze is lasting, and shall we be doomed forever to look at barren, bizarre, clumsy and uninteresting forms, simply because we are too poor to afford it in stone, and it cannot be made in brick, while, if we took the above course, we might revel in beautiful forms outside and in; and æsthetic art would never make it so thick that you would wallow in it, as in the Zopf time, although I say it with all reverence. There is no period more

[1] The present *flèche* of the Sainte Chapelle is of wood covered with lead.—EDS.

instructive to the art student than the *Baroque*, for no century to my knowledge has given us so much phantasy, or such a variety of vigorous form, or such a number of really great talents, but having departed from true principles their work could not last.

Let us have beauty and meaning, too, in our decorations, but let us not forget that beauty is a very delicate and tender plant; it requires much nursing, weeding and trimming, *i. e.*, labor of love, labor that cannot be delegated; for the artist should go to nature for the basis of all his forms, bend them to his will, and impress them with his own individuality; that is what makes art of it, and when it is art it will always command respect sooner or later. All natural forms require a certain amount of conventionalizing to bring them into suitable harmony with the architectural lines and forms of which they are to form a part, and it is in this conventionalism that the artist gives his own personal interpretation of the natural forms; it is here that he impresses his own personality, and that makes it *his* work.

The architect in this country has two distinctly different and antagonistic duties to perform, each requiring talent the opposite of the other, and the two have never yet to my knowledge existed in the same person to more than a limited degree. The one is the builder's which constructs and engineers; the other, the poet's which makes "crystallized music" of the structure; the first is a necessity, the second is a desirable accessory.

By the possessor of the first, the mathematical temperament is required, the executive function; he is like the general of an army, who directs and supervises the movements of the whole; he sees that the quartermaster has the proper supplies always within reach, he looks after the accounts, the construction, keeps the corps in proper, healthy motion, and brings the building to a successful completion; this is the supervising architect, the "man of affairs," and the corps of clerks-of-the-works, accountants, constructive engineers, etc., is his his staff.

In the other lies the designing function, which requires rather the artistic, the poetical temperament; he needs to be a book-worm, an observer of everything (except business) between the grass and the stars. His mind should be stored not with figures and computations, but with the architectural and decorative forms of all times, nations and climes; he should be a philosophic thinker, who wants to know the whys and wherefores, and see the bottom of everything in his line, an original as well as practical man (there is no use in the conception of impossible things): the corps of draughtsmen is his staff, but everything from the main conception down to the working details should pass through his hands, for then only is a perfectly harmonious whole possible.

Since the combination of these two opposite talents in a high degree in one man would be a miracle, there should be always two men to do what is expected of the architect. A great and permanent success is then possible—by this process I think the grand cathedrals grew up. Such combination is still the custom in Germany in a modified form. The failure to comprehend this point left England, with few exceptions, behind the rest of the world until the present century, when the Gothic Renaissance sprang up, and it was a sad day for our art when Lord Palmerston said to Sir Gilbert Scott, "I don't like your Gothic." It would have been a smaller disaster had Wellington failed at Waterloo, and had the British lion been doomed to do house-work for Napoleon for a few years. English Gothic was moving forward with such vigor and promise that if the "noble Lord" had left it alone it would have conquered the world, and the late monstrosities of clumsy crudeness, highly polished, would have become impossible. As it was, the movement early and late, with Ruskin as the central figure, brought English art (painting, sculpture and architecture) from nowhere to fully abreast with the rest of the world. A compilation of the works of Sir Christopher Wren on one sheet is an amazing spectacle; there is about as much of it as a whole generation of Frenchmen or Germans accomplished in those days, yet looking over the whole, the main characteristics that proclaim it "Wren's" and "English" are clumsiness and crudeness of detail, where it is not a slavish copy of the books. How could it be otherwise? It was far too much for one man, and the result was quite natural. The custom in England was, and is largely to this day, as also to some extent in this country, for the architect simply to make the block-plans and sketches for his work, then hand them over to his draughtsmen or clerks to work out the idea. The outcome of this practice was and is that the bulk of the works possess no individual character, seldom refinement, and often no character at all, for the clerk being a subordinate tries to suit the "boss," and never can impress his own individual character fully on his work. An architect may surround himself with a corps of draughtsmen who understand him so well that you cannot tell their work from his, nor his from theirs, but this at once lowers the work in grade; it drops down from art to business. If a man feels that he is not so well up as a specialist in something he wants to apply, let him get a specialist to put it in and the whole work will be the better for it. But imagine if you can the result, if Goethe, Carlyle, or Wagner had only made the block-sketches of their works, and handed them over to their clerks to work out and elaborate their ideas; the cases are analogous.

There is this to be said for the draughtsman or clerk, though he has no identity: I know several important and successful works where the clerk made the sketches as well as the elaborations, and I know several others where there would have been a general gain if he had; and among draughtsmen I have known some of the most studious, learned and ingenious designers, as well as original ones. The English barrister said, "If I were an architect I would not call myself an artist." That was all right for him in all probability; some folks would and some should not; but I am talking specially to that element of our fraternity, especially the young men, whose face is ever turned toward Zion, in an art sense, though some of us may never get there, but we earnestly look in that direction. If we hope, however, to see daylight in our art the office must cease to be a drawing factory, for the factory part of it is sure to kill all the better aspirations in master as well as clerk. Of the twenty odd hundred drawings required for the Law Courts, Street made every one with his own hands; he even retouched the works of his modeller; this latter shows what importance he attached to the purity, refinement and *individuality* of original detail, and who stands higher than Street in the profession? When Liènard was about to publish his work, Paris had no engraver who was capable of giving the individuality of his drawings, hence he was obliged to do it himself. The work on the detail and working drawings is what lives in the building after the job is finished and paid for.

Since nature abounds in beautiful forms, masses, lines and colors everywhere, why should the work of man partake so much of the rocks or the farmer's stone-pile, and here even we are beginning to drop out the ferns, the lichens and the wild flowers that grow in the crevices. Nature leaves nothing unadorned, hence every reason for decorating our works, but let us see to it that our own decorations do also *adorn*, not simply befuzzle; let us ever keep the "accumulated experience of ages" before us; let us form an intimate acquaintance, that reaches down to the small details, with the great historic art monuments of the world, for I feel satisfied that this present severity and simplicity is the result of only a "bowing acquaintance" with the great works of history. Let more time and importance be given this point in our training-schools, and when we shall have become reasonably well skilled in it we will find more to admire in it, as well as more pleasure in the practice of it; and what we shall make will be more worthy of contemplation, and then our works will command a lasting respect, but not till then. The eye will then no longer be offended with Renaissance pilasters and columns of twenty-five diameters, with dreadful caps as often seen in "prize designs" of "leading architects" in the West and hereabouts, puffed by country papers as "grand and magnificent," though never quoted or copied abroad.

I hope yet, however, to see a better day, the time when the cultivated Englishman will no longer quote our work as "poor, but pretty good for an American." In our design let us be ourselves at home, not "*en parade*" or before company. There is talent and stuff enough in us if we do but get started aright; with every man in his proper place to give us the same position relatively in architectural art abroad that we now hold in machinery and watches; let our book publications be only the original works of the most advanced men, and let the puerile trash of second-class draughtsmen and botched-up copies of good catalogue designs become things of the past, and be eliminated from our shelves. A leading architect once asked me "what are books for if not to copy from?" Another complained that the new books with new ideas came so slowly that he always got tired of copying one thing before a new one came out. Washington Irving's neighbors owned the land but he owned the landscape. Every nationality and time owns its own lines and forms, but all established principles are ours and everybody's else. Let us quit copying altogether; and why should we copy, since the whole history of architecture is but a series of experiments, each fresh period being the attempt to improve former efforts? What others have done we surely can do. Let us learn vigor from the modern English and the Cossack — the antique English, with few exceptions, is hardly worth the candle for our purpose,—elegance from the French, system from the Germans, color from the Orient, patience from the Chinaman, and "crankiness" from the Japanese; let us ever think, think, think, and our work will sparkle with thought, form and expression. I think it was Ruskin who defined ornament as "intricacy combined with thought," and intricacy without thought as filigree.

Thus equipped, let us work out our problem in our own way, decorating with nature's forms slightly conventionalized. Let us be much more critical with our own work than with that of others. Let self-complacency be banished from our code. Let us not be satisfied with anything we can make, until in proportion, of the whole and in detail, it is as good as the Greek; till it looks comfortable, not as though it had been sat down on, any more than stretched out to make it long enough; till it is as harmonious and chaste as theirs, and everything is as appropriate for the purpose as the columns of the Parthenon. [In the decorations the first essential is the outline, this covers the subject, form and distribution — in the foliations get as many straight lines as possible, and architectural lines and ties to hold the thing together. The modulation accents the whole expression and by it an interesting play of lights and shadows and the one-hundred-and-one middle tones are given.] When our proportion and combination are settled, let us soften down the angularities and refine the details and foliations until they are as sweet as the French, make the projections as bold as the English or the Russian, correct and systematize it as thoroughly as the best German work, and in the fillings of the panels and details let the Florentine be our model, together with Indian lace and Moresque work. Great as this undertaking is, yet undauntedly let us aim at perfection and we shall strike somewhere, and though we may never come into dangerous proximity with our ideal yet we shall have done our part in the common cause — this labor of love, love for the right, the true and the beautiful, love for our art, and love for the fatherland (it is my adopted one, but I came here before they cried "'Rah for Zach Taylor").

Let our lives be pure and our art will be pure, for I have never yet seen a bad man produce a good work of art, — the Pompadour morals are quite distinctly readable in the decorations of the period, — and if the influence of our art is not good, our country had better do without.

Together with this paper I have made a sheet of sketches [See Illustrations] showing my idea worked out in the various buildings, and when I say the sheet is the work of but six days (all I had to spare), further excuse for the imperfections will not be needed, yet it gives in a rough way the direction in which I think we should go. I have given brackets and veranda posts and trim, as now in vogue and as I would like to see them. I would respectfully ask the various Chapters to discuss the points of this paper, criticise it, as well as the sketches, and where they think I have erred give us the corrections; and if some think the whole is bosh, all right, give us something that is not bosh, for it will not be the work of a day or one man, and if this generation works out the problem successfully, we may be considered eminently successful. I have had two criticisms already — a friend of mine, an architect of note, an Englishman, said that I had "Dutchified the Renaissance;" another, a sculptor of very considerable erudition, a German, remarked, "You always get so many English forms in your things."

In attempting to crystallize this matter into appreciable form, the following ideas have suggested themselves. The first thing to do is to get the block-form or mass-form, and, dealing with the monumental building, it must first give us the necessary accommodations on the floors, with practically not more than two or three stories, and containing one, two, or three large assembly halls and a basement. This gives us: the greater the building the "squattier" the mass-form to deal with. The grand heroic effect aimed at and attained too in the Middle Ages, is no longer practicable, hardly possible, a fact universally recognized (see the Grand Opéra, Paris, and the late prize designs of the Reichstagsgebäude, Berlin), yet a public building should always have something towering up above all in its neighborhood, to proclaim the fact afar that here is where McGregor sits, here is the head of the table. It should be in our case slender, vigorous, bold, rakish and daring. I think R. M. Upjohn came nearer to it in the Hartford Capitol than any building in this country. The American Victor Emmanuel Monument design by Henry L. Gay, Chicago, shows the same spirit in the lines and mass, also Dostick's design of the model for the Washington monument, "*Pluribustah.*"

This form of sky-scraper gives that peculiar refined, independent, self-contained, daring, bold, heaven-reaching, erratic, piratic, Quixotic, American thought ("young America with his lack of veneration"). The capitol building should always have a dome. I should raise thereon a gigantic "sky-scraper," contrary to all precedent in practice, and I should trust to American constructive and engineering skill to build it strong enough for any gale. The court-house has similar requirements on a smaller scale, the Government building is a compromise between the judicial and commercial; there is the church with plenty of ground, crammed in between store-blocks in a city and the country church — different conditions governing each. With the school-house the tower business should end, for in the single store, store-block or country seat, there is no sound *raison d'être* for one, except that the tower on a house used to entitle the owner to be called captain or major, but that has become too common. In the way of cresting, finials, etc., I have given some original suggestions, as well as gable and general decorative designs; and the two sitting figures are intended to show that there should be a harmony between man and his surroundings — and what kind of art forms harmonize with the man of to-day, "the young America." In the hope of seeing this vital point of the future architectural form of America widely discussed, extensively drawn and sketched, and worked up so that all imaginable sides of the subject shall come to the surface, and all imaginable interpretations of it, I leave it with Schiller's

> "Schlag den Zapfen raus
> Gott bewahr' das Haus,
> Soll das Werk den Meister loben
> Doch der Segen kommt von oben."

John Moser.

Atlanta, Ga.,

Windowless Houses in France. — Mr. Bright's appalling statement as to the number of families in Glasgow living in only one room apiece is capped by the statistics of overcrowding in French cities given by M. Naduad in support of his bill dealing with unhealthy tenements. According to M. Naduad there are 219,270 houses in France without any window whatever, and to which light and air are admitted, when admitted at all, only through the door or a hole in the door, which has to be stopped in wet or cold weather. Allowing five people to a family, more than one million persons altogether must be housed in this execrable fashion. In Paris, although sixty thousand tenements have been dealt with in the last thirty years under the act of 1850, there are still between three or four thousand families living in single rooms without means of warming, and between two or three thousand in single rooms with no aperture for light and air—cupboards in fact. Between twenty-five or thirty thousand habitations consist of a single room only. "This side of the social question," says the report from which these statistics are drawn, "has to be faced before all others"— a conclusion which is gradually forcing itself on the minds of men in other countries besides France.—*Pall Mall Gazette.*

FROM BAYREUTH TO RATISBON. — NOTES OF A HASTY TRIP. — IX.

Among the recently added attractions of Nuremberg is one great in interest and value — the *Germanisches Museum.* Established only a few years ago it has been so liberally subsidized and so intelligently filled that it has now only two rivals in all Germany— the analogous collections at Berlin and Munich. In one way this of Nuremberg is the most satisfactory of them all—by reason of the nature of its housing. No brand-new building with great rectangular rooms contains this marvellous collection of old-world treasures, but a late Gothic convent which, with its adjoining cloisters, has been cleverly put to service. The rooms are many and well-lighted, and their being of such different sizes but adds to their availability. The long corridors of the cloisters serve as a repository for the casts and works of sculpture, while the charming little green quadrangles upon which one comes at every turn, accommodate the larger pieces and the architectural relics. It is hard to say what is not contained in this charming museum—casts and sculptures, furniture of every sort, iron-work, embroideries, tapestries, wood-carvings, porcelain stoves, pottery, stained-glass, goldsmith's work, and all the minor objects which mediæval craftsmen turned from mere things of daily service into things of perennial beauty. There is also a large picture collection, and an immense and most valuable collection of old prints and original wood-blocks, all the things of every sort being of German origin. Each description of work is arranged by itself and catalogued bit by bit with labels so full, so clear and so accurate that they are a standing reproach to the always insufficient and often slovenly and misleading cataloguing of our own museums. All the treasures which had for long been housed in various Nuremberg buildings have now been collected in this museum. Hundreds of things have been brought from other places, and rich gifts have not been lacking. The famous little collection formerly in the castle is now here, pictures and all, as well as the larger collection of pictures (including the fine Dürers), which used to be in the unused Moritz Capelle. The paintings occupy a long, admirably lighted gallery at the top of the building and some adjoining rooms, while in another corridor have been wisely put apart by themselves all such paintings as are not artistically of much worth, but are still valuable for historical reasons—chiefly as records of costume. It is a bewildering labyrinth of beauty, this old convent which has been put to modern uses, but in no way injured as to its own characteristics. One loses one's self, perchance, and, seeking ever new things, revisits ground already covered; but to be obliged to travel it again is scarcely a misfortune, and one is amply repaid for any little loss of time in seeking one's bearings, by the pleasure of seeing lovely things in such appropriate surroundings. This is no regulation museum, which by its logical regularity tempts one to fall into the galloping tread, the impatient hurry of the typical tourist, to whom time is indeed money, and more than money. I know of no other place save in the Musée de Cluny at Paris where this tourist speed seems so much out of place, these tourist habits so lose their hold. One looks and dawdles and really sees and enjoys doing one's task for pleasure and not for duty.

To pass from these ancient walls with their time-worn contents to the outskirts of Nuremberg and the Industrial Exhibition which was in progress last summer, was indeed a change. Here I must confess one went at the call of duty only — simply to inform one's self, or, more likely, to avoid the certain shame of being afterwards taunted with one's crime in visiting Nuremberg while the great Bavarian exhibition was in progress and lazily neglecting to see it. Who for pleasure merely would choose, with all the beautiful antiquity of Nuremberg about one, and its lovely surrounding country tempting one's eyes and feet, to spend a day in these dusty, teeming wooden barracks, looking at mountains of spools of thread, pyramids of sausages, puffing steam-engines, wax figures dressed in fashionable toilettes, and all the rest of the commodities which, in ancient Nuremberg as well as in modern Boston, make up an Industrial Exhibition of to-day? And to spend one day in such work was nothing. The exhibition was immense, and seemed all comprehensive, though limited to the products of Bavaria only, and in a whole day one could not even gain a general idea of its extent, much less of its contents. The immense mass of these showed the most cursory visitor, indeed, how great is the commercial and manufacturing energy of the country to-day, how vastly it has grown within the last half decade. But more than this it was hard to perceive, except in the few directions where one's own taste or experience had fitted one to judge. I can say nothing of the soap, the sausages, the carriages, the cloths of Bavaria. I only know that one of the most picturesque

spots in the exhibition was a great booth where beer was dispensed by Tyrolean peasants in costume and—what every one could guess who has been to the city at any time—that the mountains of Nuremberg *pfefferkuchen* were simply overpowering, that nowhere else but in this city can one learn what this delectable food may mean, and that one may live weeks in Nuremberg making constant experiments and yet not become acquainted with all its varieties, or appreciate all their charms. Farther than this I can only report on the artistic or semi-artistic objects that were gathered together. There was a rather large collection of modern pictures which, seeing the rank of Munich in the art world to-day, we thought would be interesting. But it was chiefly remarkable for the absence of all the best names and for its exceeding dreariness of aspect, speaking more of the Düsseldorf of a past generation than of the Munich of our own. There was only one contributor who was impressive, but he is one of the giants of to-day, and his few pictures made it worth one's while to have scanned all the tediousness of his brethren. This was Lenbach, who is surely, if not the very greatest of living portrait-painters, at all events no whit behind the best. I do not know any one whom I can quite rank with him, not only for the force and truth of his portraiture as such, and the technical brilliancy of his work, but for the grand and sober beauty of his results—among all the portraits of to-day the ones which could most safely be hung side by side with the Titians and Rembrandts of other years. His chief contribution was one of the many versions he has made of the splendid figure of the great German Chancellor. This time he was in civilian's dress, with the high stock about his neck and the great slouch hat upon his head that he wears when in retreat at Varzin. A half-length, seated figure with the head turned partly away from the spectator, it was one of the most magnificent specimens of the art that I had ever seen—as vivid as nature (nay more vivid, for it showed the characteristic facts of nature intensified by art), and as beautiful as fine workmanship, fine color, and above all a marvellous tone, could make it.

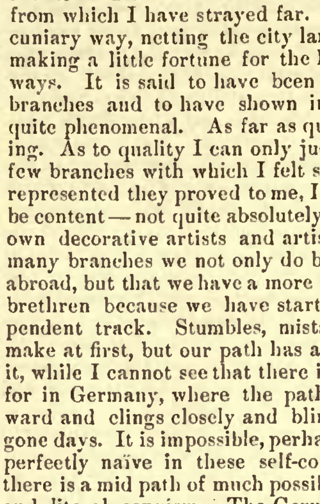
Turning to the decorative and industrial arts one saw signs that much improvement had been made in Germany within the past few years. Not only at this exhibition but wherever I went last summer I found the same thing—that whereas some dozen years back it had been almost impossible to furnish a house tastefully with modern-made articles it was now the easiest thing in the world so to do. Paper-hangings, carpets, curtain draperies, furniture, ornaments,—everything had improved in color, in design, and in outline. A similar improvement has, of course, taken place in our country during the same lapse of years; but there is a difference to be noted between the two movements, and it is a difference, I think, which tells in favor of ourselves—not only just at the moment but still more as we try to predict what future work may be. We are apt to say of ourselves that we can discover nothing new, that it is too late to try to be original in decorative art, that everything has been said and done already and that what remains for us is only to say and do the same things over again, adapting them as intelligently as possible to our novel needs and uses. There is a certain measure of truth in all this, yet it is, I think, a smaller measure than we quite realize. We so clearly perceive the old borrowed elements in our work that we do not appreciate how many new ideas or at least aspirations it contains until we compare it with what is being done in foreign countries. Or if we see that it is new we perhaps doubt whether it is really good or whether it only so appears to us because we are isolated from the best work of former days. But let us compare it with current work abroad, and in many directions we shall see reason to congratulate ourselves both upon our present success and upon our promise for the future. It is several years since I was in England and I cannot speak with as much confidence of English work as I should wish; but taking the Continental, the French and German both, I will say that the more I saw of it last summer the more satisfied I was with what we are doing here at home. Not that it is all good—not much of it comes near perfection; but it is far better than some of our critics would have us believe, and especially far more original. In Germany just now it is easy, as I have said, to get good furnishings of every kind, but every individual article will be found to be *an exact duplicate of something old.* The industry with which old things are collected and studied, the patient skill with which they are imitated are quite remarkable, and the result is work which is indeed a boon to any householder who, like the writer, went through the agony of trying to furnish a home decently some dozen years ago. But the result is less satisfactory when we come to look ahead, to imagine what will be the result of the new movement. It can have none very valuable that I can see, unless a radical change comes over the spirit of maker and purchaser. The "correct thing" to-day is to have everything *Alt Deutsch*—not "Old German" in the sense of being an adaptation of motives used long ago, but "Old German" in the sense of being a literal copy of some one definite old production. The dealer cannot vaunt a new ware more successfully than by telling how it was copied—whether a stuff, a chair, a bit of iron-work or of pottery—from an original somewhere preserved and giving chapter and verse of reference to this museum or to that. Many of these copies are very cleverly executed—with just the one last touch wanting which belongs to creative instead of duplicating work; but they all are copies, not adaptations even, and in view of them our adaptations, even though not quite successful, gain a certain merit which these lack. And many of our adaptations *are* successful, and some of our products deserve less the name of adaptations than of new departures. Our embroideries for instance. Mr Clarence Cook sees fit to have a fling at them, together with some other very good things, in a recent number of the *Princeton Review*, and tells us we may possibly do good work in this line as soon as we begin to think a little less highly of what we have already done, and to cease to say that it is better than what is done anywhere else in the world. But suppose it *is* better? Why should we not say it? And would our blindness to the fact make us likely to improve still farther in the future? This is not the place to dilate upon any special example of our handiwork, as upon Mrs. Wheeler's embroideries, for example; I will only say that leaving the Orient out of account, considering only what is done in European countries at the moment and including England in the list, ours *are* the best, the most beautiful, the most artistic, infinitely the most varied and least mechanical in motive and infinitely the most original, copied from no prototypes but using natural elements in quite novel and yet unforced and spontaneous ways. It is not enough to say that few things are done on the Continent to-day which can be compared with them. In so saying we must add also that *nothing* good is done there at all but that which is *copied*, while these are not copied, not even adapted. I shall have another word to say on this subject when I come to speak of Munich. Now I must close with a brief return to the exhibition from which I have strayed far. It was an immense success in a pecuniary way, netting the city large sums over the expenses, besides making a little fortune for the hotel-keepers, shop people, and railways. It is said to have been a most creditable display in all its branches and to have shown in many a recent advance that was quite phenomenal. As far as quantity went it was certainly imposing. As to quality I can only judge, as has been already said, in the few branches with which I felt some sympathy. And as these were represented they proved to me, I must repeat, that we have a right to be content—not quite absolutely but comparatively—with what our own decorative artists and artisans have been doing; that in very many branches we not only do better work to-day than can be done abroad, but that we have a more hopeful future than our Continental brethren because we have started forward on a more or less independent track. Stumbles, mistakes, gross blunders even, we may make at first, but our path has at least a possible rich goal ahead of it, while I cannot see that there is anything very hopeful to be looked for in Germany, where the path of improvement has turned backward and clings closely and blindly to the well-trodden road of bygone days. It is impossible, perhaps, for any one to be perfectly fresh, perfectly naïve in these self-conscious, over-educated days. But there is a mid path of much possible fruition between absolute naïveté and literal copyism. The Germans are treading the last named, but we ourselves have, I think, at least put a sturdy foot in advance upon the middle way.

M. G. van Rensselaer.

THE ILLUSTRATIONS.

THE CRANE LIBRARY, QUINCY, MASS. MR. H. H. RICHARDSON, ARCHITECT, BROOKLINE, MASS.

[*Gelatine Print.*]



THIS is the third village library that Mr. Richardson has designed in Massachusetts, and, upon the whole, the most successful. The first of these three was the town library and museum at Woburn, and the second, the Ames Memorial Library at North Easton. Each of these is of high architectural interest, and the three have a strong family resemblance. But the latest is the most simplified as well as the most refined in treatment, and gains thereby in singleness and force of impression. The library is one room, without even a vestibule, although the deep and sheltered porch serves the purpose of a vestibule. The books and the librarian are protected from the unauthorized incursions of readers by a light open screen of wood-work. The projecting turret contains the staircase that gives access to the attic, in which records and files not in common use are stored, and this is lighted by the triple window in the gable and by the small openings under the pent-house "eyebrows" in the roof. Nothing, evidently, could be simpler than this plan, and nothing could be more forcible than the architectural outcome of it. The style is the Provençal Romanesque, in which the architect commonly works, and in which he contrives to express an artistic individuality so marked and characteristic. The building owes not a little of its picturesque force to the judicious choice and rugged treatment of the material. The field of wall is a pink granite from North Easton, which is very light without being cold in effect, and is laid rock-faced. The complementary stone is a dark and rich brownstone from the Longmeadow quarries, also rough-faced except where it is modelled or carved in decoration, the darker color being of course always employed where it is intended to give special

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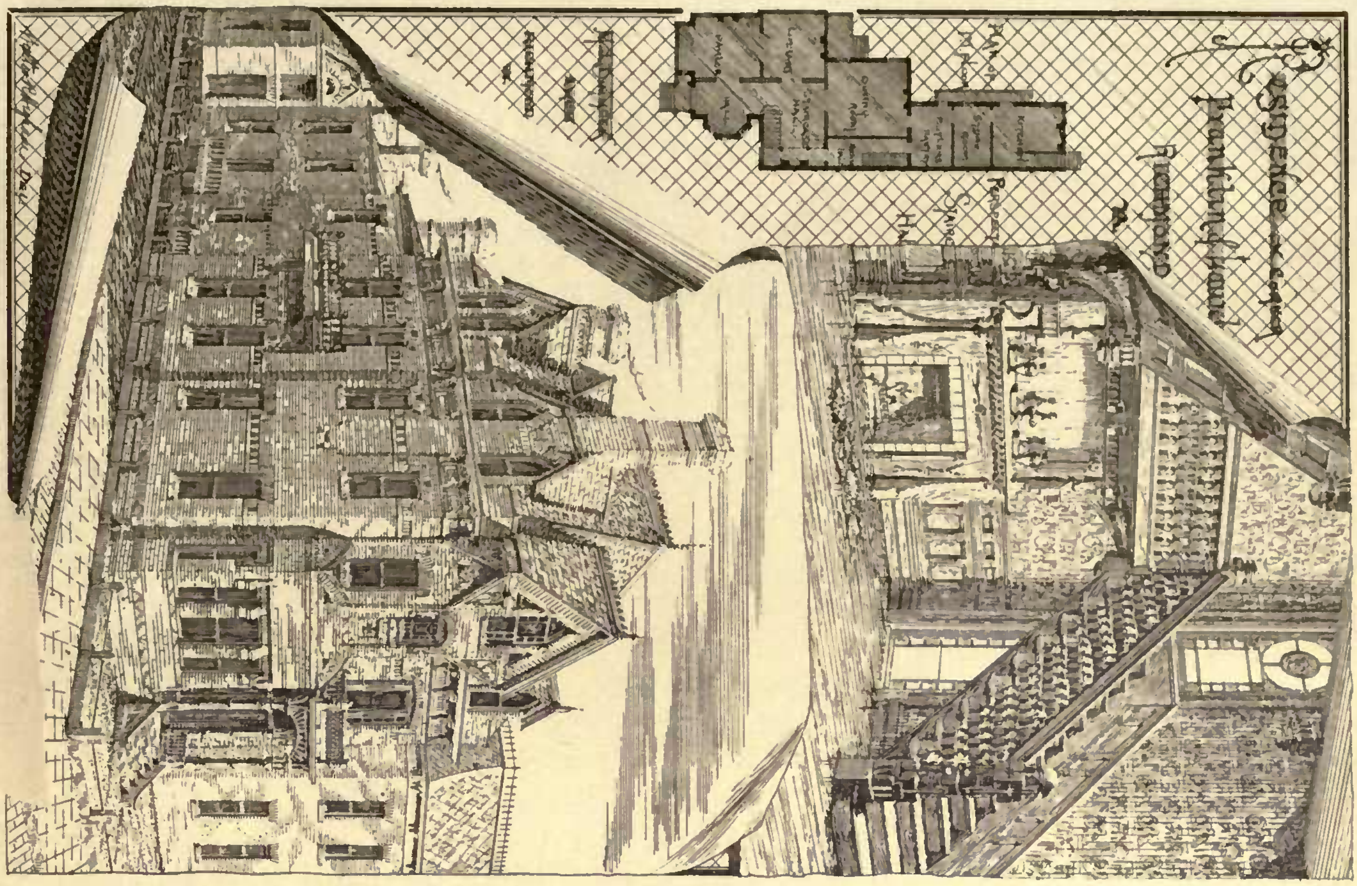

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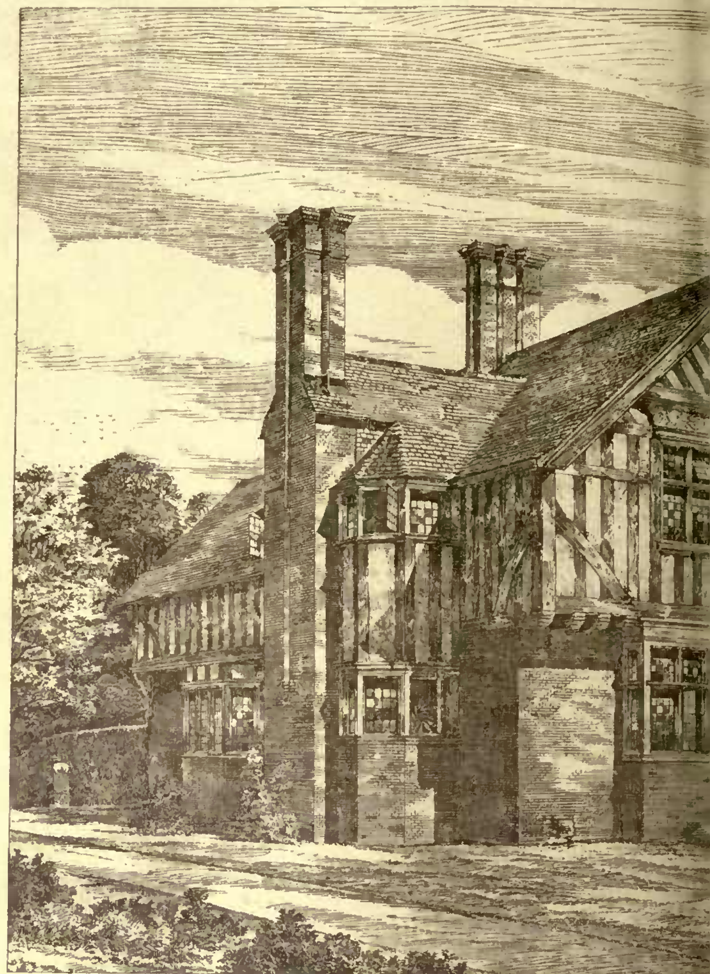
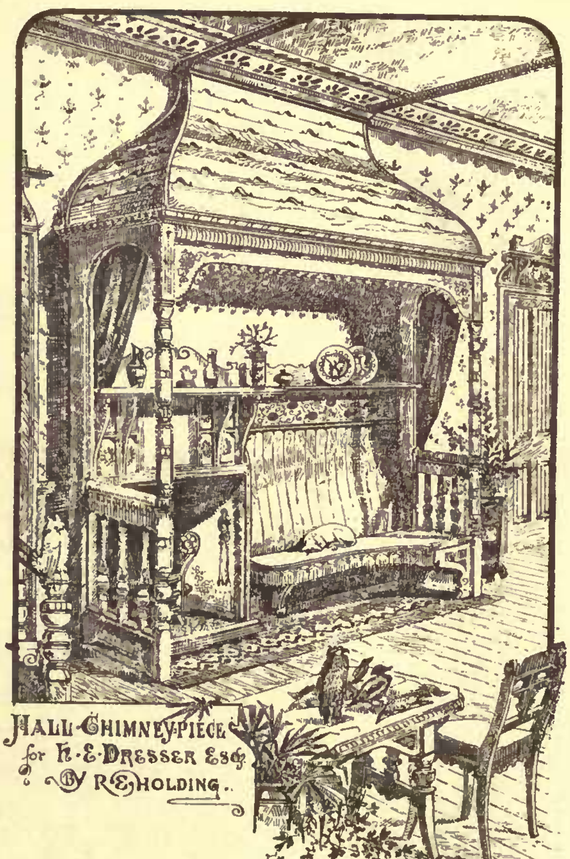
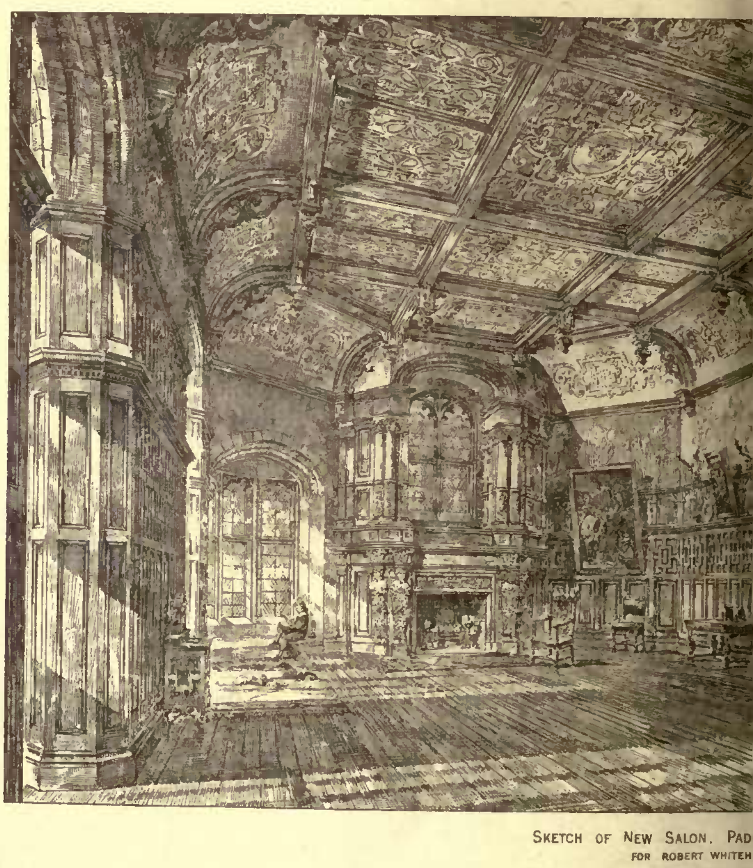




THE CABINET MAKER



SKETCH OF NEW SALON, PAD

FOR ROBERT WHITEH

ARTHUR CAWSTON, AR

OUR FOREIGN E

The Building News

The Builder.

THE CATHEDRAL OF PALERMO, SICILY

RST, SUSSEX.

The Architect.

At the Royal Academy

The British Architect.

CHANGES XVI

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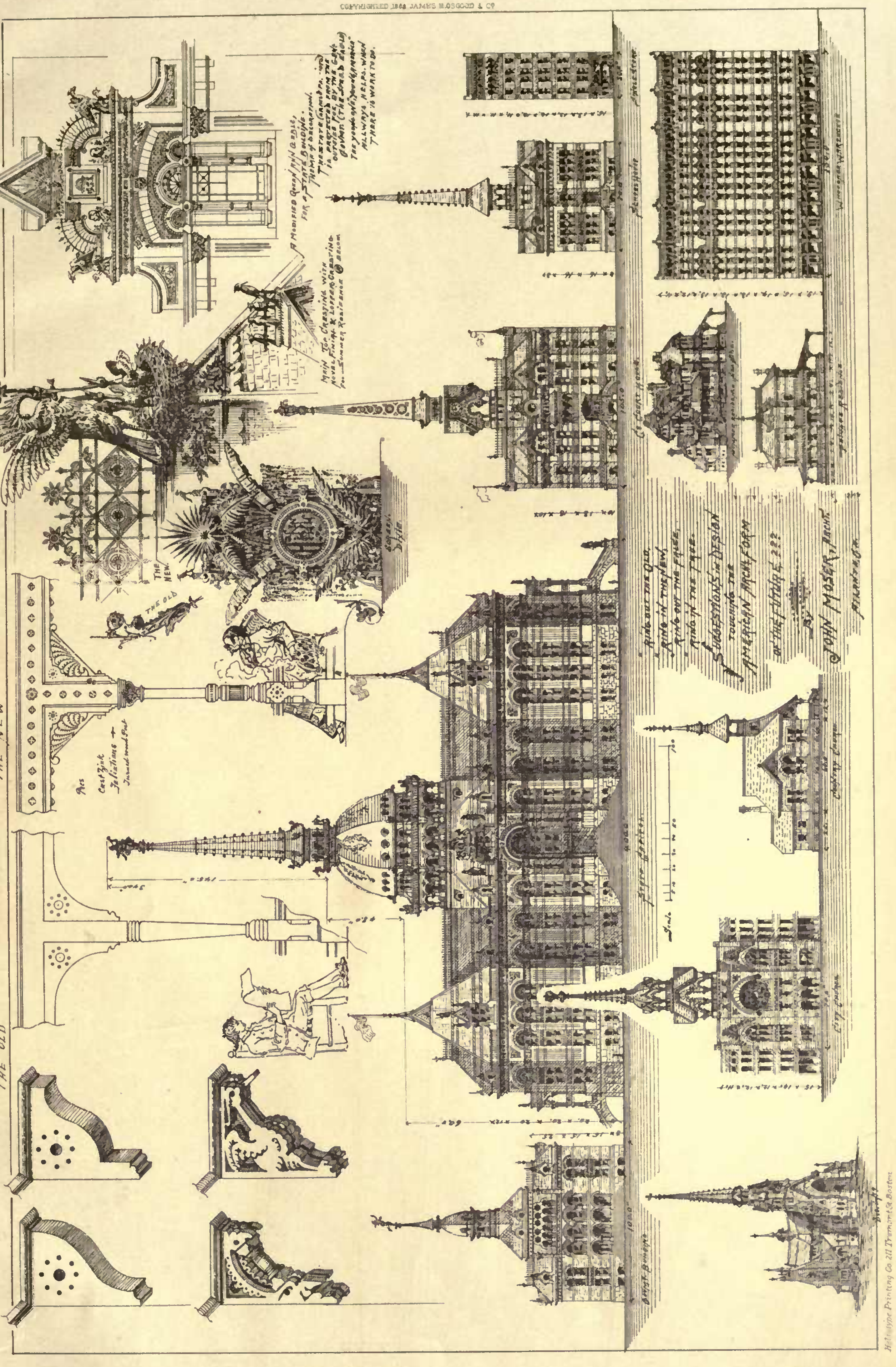


emphasis to the design. The same combination has been used in the Albany City Hall, and in the Ames Memorial Library at North Easton, and nothing could be more effective. But "the workmanship surpasses the material." In fact, the choice and combination of the material are part of the design, which, even if it were executed in monochrome, would make a striking and admirable building. Simple as the composition is, it is as far as possible from being bald or monotonous. A parallelogram of these dimensions with unbroken walls and a single roof could scarcely have been saved from baldness and monotony. It is saved here by the emergence of the gable and its attached turret, *not* in the centre of the front, mind, on the side visible, by a larger counterparting gable on the side opposite, by the unsymmetrical gables at the ends, and by the situation and treatment of the chimney. And all this is so well studied that there is nothing forced, no appearance of "making architecture," but the composition seems as simple and spontaneous as if it came so. There is a complete equipoise and balance, with no approach to formal symmetry in the two wings of the front, which is brought about by the skilful arrangement and contrast of the two sets of openings. A striking instance of the length to which variety may be carried in skilful hands without becoming restlessness is afforded in the courage with which the entrance is placed "out of centre" in both directions, neither in the centre of the wall which it pierces horizontally, nor in the axis of the central opening of the triple window above it vertically. The impression of rugged strength is everywhere kept by the ample spaces of rocky wall, either in unbroken wall-spaces or in powerful wall-piers. No detail could disturb the impression secured, and the effect of the decorative detail here employed is to enhance it.

The real successes of detail, however, are in the interior. Here, too, the arrangement is as simple as possible. The posts which divide the alcoves, and which are modelled above into pairs of columns corresponding in position to the heavier mullions of the exterior colonnade, carry the principal beams of the ceiling, which is flat at the centre, and follows the slope of the roof at the sides. These sloping sides are covered with embossed leather, while the wood-work throughout is of white-pine — a choice as felicitous in its way as that of the materials for the walls and roof. It has been carefully chosen, of beautiful and varying colors, and the "tone" of the interior, given by this wood, the darker leather of the hangings, and the stained-glass in the upper lights of the great mullioned window, is rich and harmonious. Over the large chimney-piece at the end of the reading-room, still in white-pine, and richly panelled and carved, it is proposed to place a bas-relief portrait of Thomas Crane, by Saint-Gaudens. Almost all of the detail of this wood-work deserves and will repay study. The greater part of it is exquisite in design and in execution. The cost of the building is said to have been $50,000; and one's surprise is excited not by the fact that so much was spent upon so small a building, but that so much good art was got for so little money.

THE AMES MEMORIAL LIBRARY, NORTH EASTON, MASS. MR. H. H. RICHARDSON, ARCHITECT, BROOKLINE, MASS.

[*Gelatine Print.*]

IT may be remembered that the proximate cause of the publication of the views of these two libraries and the view of the town-hall at North Easton, published May 19, 1883, was the publication of sketches of these several buildings in the *British Architect* early in this year, by whom the authorship was attributed to others than Mr. Richardson. It is only proper to state that the error was one for which our excellent-hearted contemporary was in no way responsible, and as soon as attention was drawn to the mistake the sketches were at once republished over the rightful architect's name, and its subscribers were requested to destroy the original prints.

CATHEDRAL OF PALERMO.

[From the *Builder.*]

SICILY is full of interest, and Monreale must be considered as the most important portion of it as regards the history of architecture. Palermo is next so.

We give a view of the Cathedral of Palermo, Including the main entrance, which is of later date than other Sicilian buildings, being principally of the fourteenth century. Mr. Fergusson, in a very interesting chapter on Sicilian architecture, says of this building, — "Although possessing no dignity of outline or grace of form, it is more richly ornamented with intersecting arches and mosaic decorations externally than almost any other church of its class. It is richer, perhaps, and better than the Cathedral of Florence, inasmuch as here the decorations follow the construction, and are not a mere unmeaning panelling that might be applied to any place. Still, the effect of the whole is rather pretty than grand, and as an architectural display falls far short of the bolder masonic expression of the Northern Gothic churches."

HALL CHIMNEY-PIECE. BY R. E. HOLDING.

[From the *Cabinet Maker and Art Furnisher.*]

THE halls of our English houses are now receiving more attention than they did a few years ago, and the skill of our designers has been called forth to invent appropriate furniture for the new order of things. A fireplace is now considered essential in a good hall, and Mr. Holding favors us this month with a design for a hall chimney-piece, which was recently built up under his direction. It was made for H. E. Dresser, Esq., the well-known ornithologist. The wood is English oak, slightly stained, and a handsomely embroidered valance extends over the front. The floor between the pillars is covered with a Turkish rug, and the hearth is in mosaic. The decorated portions are in flat colors, painted on the natural surface of the wood. There is an old chimney-corner look about the design which would recommend it to many who have quaint fancies.

HUNTING LODGE, WINCHFIELD.

[From the *Building News.*]

THIS house is now being built a short distance from Winchfield. The materials being employed are red brick, tiles, and oak. The plan is arranged mostly by the client. Mr. T. E. Collcutt is the architect. The drawing was exhibited at the Royal Academy.

SALON, PADDOCKHURST, SUSSEX.

[From the *Architect.*]

WE publish this week a view of the *salon* at Paddockhurst. The mansion was originally designed by Mr. A. Salvin, and the additions have been carried out under the direction of Mr. Arthur Cawston, architect.

CLUNY EAR-RINGS.

[From the *British Architect.*]

HOUSE FOR C. S. BELL, ESQ., HILLSBORO', O. MR. HENRY BEVIS, ARCHITECT, CINCINNATI, O.

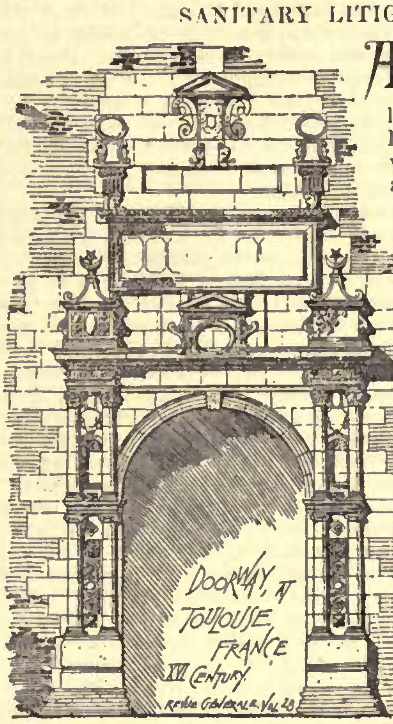
THE house is built of deep red brick, with trimmings of Bedford, (Ind.), limestone, and the interior is finished with chestnut wood.

HOUSE AT RICHMOND, VA. MR. M. J. DIMMOCK, ARCHITECT, RICHMOND, VA.

SUGGESTIONS IN DESIGN TOUCHING AMERICAN ARCHITECTURAL FORM. MR. JOHN MOSER, ARCHITECT, ATLANTA, GA.

SEE article on "American Architectural Form of the Future."

SANITARY LITIGATION.



ANOTHER of those cases in which the owners of houses are now being held liable to tenants for the unhealthiness of their property was decided some ten days ago. The litigation took place, it is true, only before a County Court; but it was in the Court of the City of London, which ranks as the chief tribunal of the kind in England, and which is presided over by a gentleman who is well known for what is called a "strong" judge, one who forms his opinions with such confidence, and expresses them with such vigor, as to indicate a good grasp of the first principles of law, and none the less a firm reliance upon the common-sense of justice. Mr. Commissioner Kerr on this occasion had before him a claim preferred by a small landlord against a small tenant for a small sum of money in respect of rent. The tenant set up a sort of haphazard counterclaim of about double the amount, which was based chiefly, or perhaps altogether, upon the allegation that the house was in an unwholesome condition of drainage, and had to be vacated for that reason. The result of the action was that the judge found for the defendant on both issues; that is to say, he gave the landlord nothing for the rent due; but, on the contrary, awarded damages against him for the unsanitary state of the house. Moreover, he accompanied his decision with a few very pertinent observations after his manner. He said he would have been ready to allow the tenant much larger damages if they had been claimed, because no one could tell what injury, present and future, might arise from living in an unwholesome house, and it was high time that landlords were taught that property had its duties as well as its rights. We presume the Commissioner is not an investor in houses; but so much the better for the case, inasmuch as we conceive the meaning of such a judicial decision to be that the Courts of Law, representing the interests of the great majority of the people, who are not rent-receivers but rent-payers, will be found disposed to put upon the shoulders of the whole class of rent-receivers

the burden of warranting the houses to be healthy, for which they receive rent. Of course there cannot be any objection to this, provided the principle be clearly understood, but it is becoming at any rate highly desirable that the understanding should be much clearer than it is.

The fact no doubt is, that the drainage of most of the dwelling-houses in towns, which the people at large occupy as rack-rent-paying tenants, may be said to be more or less defective; and the causes which have brought about this condition of things, although frequently explained to the public of late, will require a great deal more exposition before they are fully appreciated. So imperfectly, indeed, are they appreciated at this hour, that even a judge upon the bench, called upon to deal with the question responsibly, has very likely no more distinct idea of a drain than that it is something nasty out of sight, which ought to be kept clean, and which smells, if it is not kept clean. As for the ordinary intelligence of the people, it is questionable whether it ever reaches farther than the mere superficial circumstance that a pail of dirty water poured down "the drain" disappears forever, sinking perhaps perpendicularly into the stomach of the planet. To them the "smell" of a drain, therefore, is a sort of emanation from the nether world; and, if it is in some way or other an unwholesome emanation, it is so, because it naturally would be so. At the same time, the unwholesome nature of the "smell," be it observed, is not by any means an accepted thing; many thousands live and die in it, and never complain; they cannot afford to be fastidious; perhaps it is worse to those who are not used to it; perhaps the smell itself is getting worse.

Let us put the case once more in a familiar way, therefore, and it is simply this: if we are to have underground pipes by which our refuse flows *downwards* and away from the house, no matter where, it cannot but follow that any gas which may be evolved from that refuse shall pass by the same pipes *upwards*, and (if it can find entrance) into the house again. This is the whole mystery. The "smell," however unpleasant it may be to noses polite, is the least of it. We lead dirty water out of the house; by the same channels we lead dirty air into the house, and it may happen that this air — we call it by the very convenient name of *sewer-gas* — shall be rank poison. Sanitary drainage, therefore, is, in a single word, the leading out of our dirty water without leading in the dirty air. The worst of it is that this dirty air is not our own, or, indeed, our neighbors' dirty air; even this poor consolation is denied us; it is the foul air of the nether world truly enough; it belongs to nobody in particular, to nobody even in general except the owners of the sewers. People's drains run into those sewers quite innocently; it is the sewers that cause the foul gas to be generated, not the drains; the "smell" is produced altogether off the premises, perhaps a mile away; and the real mischief is that, as sure as the drainage flows down, so surely the sewer-gas flows up the same channel, and so we cannot get rid of the one without taking the other in exchange.

This being so, and the obviously necessary ventilation of the sewers being somehow confessedly impossible for the present (this seems to be the plainest way of putting it, however pitiful the confession may be), it follows that it is an especial duty of somebody's to prevent the entrance of the sewer-gas into the house; and, speaking in a practical way, if the sewer-gas is becoming more poisonous, or if the inhabitants of our towns are becoming more easily poisoned, or if, to say no more, we are getting to be better informed about the matter, and merely on that account more sensitive, the common law of England (which has a remarkable way of adapting itself to circumstances as they arise) will inevitably meet the case in one way and not another. That is to say, if a house is found to be what the law regards as uninhabitable by reason of its being pervaded by sewer-gas, the courts will lean towards the protection of the tenant's health rather than the protection of the landlord's rent. For health is life, while rent is only profit; and between a dead tenant and a diminished profit, it is needless to ask which side must be most identified with the interest of the public, if only as the greatest good or least evil of the greatest number. Upon any such line of reasoning, obviously, the judicial mind will, indeed, as the question develops itself, only more and more distinctly discern, as a principle of public morals, that an agreement to pay rent for the use of a house involves the condition, whether expressed or not, that the house shall be usable, and above all things usable with reasonable confidence in respect of health. The chief ground for anxiety, however, is that the application of such a principle by our judges, and by our juries under their direction, may very possibly take such a form as to produce a serious effect upon the value of house property. In fact, it may at one and the same time lower the selling price at the expense of the owners, and enhance the rental at the expense of the tenants; but this point we cannot now discuss. For the present we can only advise all house proprietors to inquire carefully into the sanitary state of their property, and all tenants who are entering upon new occupations to be equally anxious upon the same subject, and so see what comes of it.

Putting the case broadly, there are two considerations to be regarded. The first is that the communication which in all probability exists in the most direct form between the house drainage and the public sewer shall be cut off. This is easily done, although generally supposed to be impossible; for example, a small receiver may be interposed underground, and specially ventilated, besides being trapped, and the thing is done. The second point is that the house drainage itself shall be so far clean, together with the ground about it, that there shall not be any generation of foul gas within the limits of the house itself. This also is easily managed so far as science goes. In some cases the drain under the house is rotten and leaky; if so, it must be renewed, and the polluted earth taken out. Sometimes a ventilation-pipe is wanted, which is never a very difficult matter. Frequently it will be found, no doubt, that the plumbing is here and there at fault, and it must be rectified. In almost all cases, if a little intelligence be brought to bear upon the facts, we may say that the ordinary drainage of ordinary houses is capable of being put to rights with much less expense than is generally supposed, whether it be undertaken by landlords or by tenants; and again we do not at all hesitate to advise our readers of both classes to inquire forthwith whether it is necessary, and if so, how it can be done.

One of the difficulties in which the Courts of Law may presently find themselves involved is the question, how far leasehold tenants are to be expected to renovate the drainage of the houses they occupy at rack-rents? This indeed opens a much wider question which may be said to be at this moment gradually rising into importance, namely, the liability of a leaseholder for the renovation, at whatever cost, of the structure itself when condemned by a public authority for reasons which go back beyond the beginning of his lease. In a word, when the bargain between landlord and tenant has been made under the impression on both sides that the house was a sound house, who is to bear the sometimes very serious loss when it is discovered to be an unsound house? For the present, what with "surrendering clauses" which were never meant to have any interpretation at all, and refined interpretations of "mere forms," which ingenious lawyers produce to order as they are wanted, with judicial precedents, like the rest, all turning upon words and not things, a poor tenant is being told plainly that he must replace falling roofs, rebuild rotten walls, chimneys, parapets, and so on, almost to an unlimited extent, even if the result should be that he gives his landlord what is virtually a new house for an old one — and literally so if the house happens to have been so decrepit as to be blown down bodily, for instance, by the wind. Compared with the cost of such renovations as these, that of renewing the drainage may be a bagatelle; but if we should find, as seems to be the case, that the public generally are becoming so seriously alarmed about drain-poisoning in particular as to threaten frequent litigation, we cannot do better than repeat once more our recommendation to all interested parties to look the question fairly in the face, and the sooner the better. — *The Architect.*

THE SIPHONAGE OF TRAPS.

21 Newcastle Street, Strand, London, May 31, 1883.

To the Editors of the American Architect: —

Sirs, — It was only the other day that I met with Col. George E. Waring's article on "Plumber's Traps," copied from your paper into "*The Illustrated Carpenter and Builder,*" of January 12. As he has referred to my experiments with traps, will you allow me to notice briefly some of his remarks. I will discuss this question more at length in the new edition of "*The Plumber and Sanitary Houses,*" which I am now preparing.

Col. Waring says: "Mr. Hellyer's experiments are hardly worthy to be mentioned in connection with Mr. Philbrick's, but it should be stated that his somewhat inconsequent conclusions as to the venting of S-traps are similar." And he adds, "most of his reasoning is based on experiments with 2-inch wastes." As a matter of fact, I made fewer experiments with 2-inch wastes than with larger and smaller sized pipes, and it is a little singular that the only quotation which Col. Waring gives is a result gained by an experiment with 1½-inch wastes. I have given (pp. 133–173, "*Lectures on Sanitary Plumbing*") the results of about ten tests with traps fixed on stacks of inch wastes, ten on 1½-inch, eight on 2-inch, twelve on 3-inch soil-pipe, and eleven on 3½-inch soil-pipe, besides referring to many others, adding "an entire book could be filled with the results of various experiments" that I had "made with traps." I believe these results were the first ever published. The traps tested are those chiefly used in England, and they were tried under nearly every condition to which the water-seal of a trap is likely to be subjected in practice. They were tested by discharges from *valve*-closets, hopper-closets, plunger-closets, slop-sinks, quick-waste lavatories, and baths, the latter discharging fifty gallons of water, through 1½-inch stack-pipes, in two minutes and a half. Testing traps is an expensive matter. I notice that Col. Waring had an appropriation from the National Board of Health, for making his experiments, and I imagine Messrs. Philbrick and Bowditch had the same; but the cost of my experiments then, and those I am now making, come out of my own pocket.

Since my experiments were published, Messrs. Philbrick and Bowditch have made some very valuable experiments with the traps used in America, and their report to the National Board of Health, Washington, appeared in *The Sanitary Engineer*[1] of August 31, 1882. The general result of their experiments is similar to mine, establishing this fact, that *all* traps require ventilation to maintain their water-seal.

Col. Waring has himself also made experiments with plumbers' traps (made from June to December, 1881), and the results, together with his deductions, are reported in *The Sanitary Engineer*,[2] of November 2, 1882. His experiments would have been more valuable had he used almost any other water-closet for his testings than

[1] Also in the *American Architect* for September 9 and 16, 1882.
[2] First published in the *American Architect* for October 14, 1882.

a *pan*-closet — a water-closet which every sanitarian now condemns, and which is fast going out of use. Besides, in practice there is little if any risk of siphonage from such a water-closet, for the tipping-pan holds too small a quantity of water to charge a 4-inch, or even a 3½-inch soil-pipe, and what is held in it is so much broken up by its fall upon the lower part of the closet "container" that it passes through the trap and soil-pipe in too feeble a form to unseal any trap fixed upon a well-ventilated stack-pipe. Perhaps this will account for the following deduction (No. 3) which he makes: "If each bath-tub, wash-basin, sink, etc., wastes by an independent outlet to a branch of a 4-inch soil-pipe open at the top, the siphoning of even ordinary S-traps having more than one-inch seal is not to be apprehended." I will say nothing about this strange deduction except this, that I should be *very apprehensive* about the unsealing of every "S-trap" fixed upon a soil-pipe so treated, unless all the "fixtures" upon it were *pan*-closets. But I note that Col. Waring has grown wiser, even if he has not grown too wise, for in his article in your paper he says, "water-seal S-traps, even when vented, are not safe under all, nor under nearly all circumstances. Practically you may trust them as far as you can see them and no farther, and even then only when you do see them constantly." I have found by experience that the water-seal of a trap is affected by the state of the weather, that it is easier to siphon it in a heavy atmosphere than in a light atmosphere, but I was not prepared for so great a difference as that given by Col. Waring in his two opinions. I consider his latest opinion, which seems to be grounded on the experiments of others rather than his own, much nearer the facts.

However "inconsequent" my conclusions may be to Col. Waring, I have satisfied myself, by my experiments, that traps having no mechanical appliances whatever, that "self-cleansing" traps, with proper treatment, may be fixed in every condition where traps are likely to be required, with *absolute safety*, provided they are properly ventilated, and this can be done at a point where the vent-pipe can never get stopped up. I have examined thousands of traps, traps solely dependent upon water for their protective seal, and I have never found one, where it has been properly treated and properly ventilated, unsealed, though I have seen hundreds unsealed from insufficiency of dip, badness of construction, and want of efficient ventilation.

Though the water-seal of a well-shaped *round-pipe trap*, with 1½-inch seal, is rendered secure from siphonage by efficient ventilation from any discharge sent through the *main pipe* on which it may be branched — with the exception of one or two extreme cases where the waste and air pipes are of great length — it is not proof against the combined action of momentum and siphonage from discharges sent *through* it, under certain conditions. In the first edition of "*The Plumber and Sanitary Houses*," in 1877, I explained this, and was very careful not to show, in any of the illustrations, a *round-pipe* trap (*i. e.*, a "siphon" trap) under a *valve*-closet; and where a siphon-trap is shown under a slop-sink, or referred to for fixing under a "tip-up" lavatory, I call special attention to its liability to siphonage in such positions, and ask for its "outgo" to be bossed up to give the trap a 2½-inch water-seal. Moreover, the air-vent to the trap is shown in the illustrations, in *every case*, on the crown of the "outgo." But since the introduction of my "anti-D-trap," I have not allowed the vent-pipe to be taken from the *top* of the trap, where it may possibly get choked, for it is not necessary, with this form of trap, that its vent should be fixed at such a point to maintain its water-seal.

Unless vented in such a manner that a portion of the water shall be sent up into the vent-pipe, to fall back again into the trap to recharge it, as recommended by Messrs. Philbrick and Bowditch, S or half-S traps cannot be fixed with absolute safety under (*a*) *valve*-closets, holding from three to four gallons of water when filled up to the brim by the contents of a slop-pail, and used also as slop-closets: (*b*) plunger-closets; (*c*) the "hopper" class of water-closet with large "outlets" and into which slops are thrown; (*d*) deep wash-basins, discharging with quick-waste valves of larger diameter than the bore of the trap; and (*e*) "tip-up" lavatories, though the grating in the outlet of the "receiver" of this kind of lavatory breaks the discharge from the basin and secures the water-seal of the trap. I have not allowed "round-pipe" traps to be fixed under such "fixtures" for years, except in the cases of quick-waste and "tip-up" lavatories, when the "outgo" of the trap would be specially bossed up to ensure the trap maintaining its water-seal. There is such a great and direct fall from such "fixtures" upon the trap, and the discharges pass through them in such a volume, that the previous contents of the trap are not only driven out, but the momentum of the body of water passing through it, combined with the siphonage of the plug-like discharge through the piping, leaves the trap with insufficient water to seal it. But though a round-pipe trap, pure and simple, will not stand such an ordeal, a round-pipe trap flattened at the top, and with its up-pipe bossed into the shape of my "anti-D-trap" (illustrated p. 158, "*Lectures on Sanitary Plumbing*,") and which is *equally self-cleansing*, will. This trap having 1¾-inch water-seal, and holding only two and one-half pints of water for fixing under any water-closet (as well as the 1¼-inch for general wastes, holding one-fourth pint) has been tested in almost every conceivable condition to which the water-seal of a trap is likely to be subjected, and it has never yet been siphoned when properly ventilated. Nor is it necessary to ventilate this trap from the *top* of its outgo. It is perfectly safe with an air-pipe taken from its branch waste several inches away from the trap. Col. Waring is quite right in calling attention to the probable chokage of an air-pipe taken direct from the crown of the outgo of a trap, and especially when badly arranged, but I have specially pointed out the evils likely to arise from such a mode of venting traps. I have distinctly stated that "no ventilating-pipe should be taken from a waste-pipe, soil-pipe, or drain, at a point which can be closed by stoppage," and I go on to say, "the vent-pipes are fixed in such a way that nothing foreign shall get into them to stop them up, and they are so connected with the *branches* from the traps that the air-currents through the piping shall not play upon the "standing water" of the traps to disturb it, or to lick up any of its water in its transit through the pipe. This is important, as a current of air constantly passing over the water of a trap would, under certain circumstances, absorb enough water to seriously affect the seal." And I have been careful in every illustration to show such air-pipes where they can *not* get stopped up, and *all* my experiments with traps have been made with the air-vents placed in such positions that nothing could rise up in them, either to foul or choke them. But air-pipes from traps are not stopped up so readily as Col. Waring seems to think. In February, 1872, I had the traps (D-traps) on two separate stacks of 5-inch soil-pipe vented to prevent siphonage. The soil-pipes and traps were fixed in a large drapery establishment in 1865. There are four valve-closets on one stack, one on each of four lofty floors, first, second, third and fourth; and three valve-closets on the other, one on each of the three upper floors. The closets are all greatly used. I had the traps on the three-closet stack vented with 1½-inch pipe, and the four-closet stack with 2-inch. The vent-pipe in the latter case was branched into the soil-pipe a few feet below the lowest trap, and continued up above the highest, where it was branched into the main air-pipe to the soil-pipe — a distance of about sixty-five feet from point to point, with branch air-pipes taken into it from the *top* of each trap. Instead of the 2-inch air-pipe to the soil-pipe, I had the soil-pipe carried up through the roof *full size*, the total length of each stack being nearly one hundred feet. I have been somewhat particular in describing this, because these *ventilated tiers* of traps have a historical value, being, as far as I know, the first so treated. I have had them tested within the last few days, and not one trap could be siphoned, though a very large number of discharges were sent through each stack of soil-pipe from two valve-closets at a time, filled right up to the brim, showing that the air-pipes are not clogged up after eleven years' usage, though taken direct from the *tops of the traps*.

I know of no trap in England which holds its water-seal so tenaciously as the old-fashioned D-trap; but what sanitarian would fix this cesspool kind of trap. If a D-trap and "Bower" trap were branched into one stack-pipe, on one level, and under equal conditions, it would be possible by discharges sent through the pipe to siphon the former ten times to once that of the latter, each trap being without an air-vent.

In my warehouse I have a 70-foot stack of 3-inch soil-pipe, with several "anti-D-traps" fixed upon it on various floors, and the traps are vented by a 2-inch pipe. In making some experiments the other day, I found no difficulty in quite unsealing a 1¼-inch or 2-inch "Bower" trap, fixed upon it about thirty feet up from the bottom, by sending only *two* discharges through the main pipe. The discharges were sent simultaneously through three water-closets and two slop-sinks fixed on the two next stories over it, and it mattered little whether the trap stood within two feet or fifteen feet of the main pipe. But the ventilated "anti-D-traps" could not be siphoned by *forty* discharges of the same kind. After sending only two discharges through the main soil-pipe, the ball dropped away from the dip, and it was then very easy to send smoke right through the unsealed "Bower" trap, by driving it into the "foot ventilation" of the drain (with an "asphyxiator") about thirty feet away from the main soil-pipe.

Seeing in my experiments how easily the water-seal of this trap was reduced to the breaking point, and finding what quantity of air passed in through it from only one discharge of a bath fixed on the same piping, I concluded — Col. Waring says "blindly" — that this trap "requires ventilation" to maintain its water-seal. If we are not both afflicted in the same way, I will show Col. Waring, if he will favor me with a call on his next visit to our country, how easy it is to siphon this trap, and how readily smoke can be sent through it from the pipe on which it is fixed. He knows well enough, for he refers to this when speaking of trap-ventilation, that if a body of air is going to pass *through* a trap every now and then, its water-seal will soon be lost.

The drift of Col. Waring's paper, as far as I understand it, is to substitute mechanical traps for round-pipe traps, and to do away with trap-ventilation. But is he prepared to fix such traps under water-closets? Traps which have their "inlets" sealed by a floating ball, or their "outlets" covered over by a gravitating-ball — obstructionists. My experience is that no mechanical appliance can be depended upon, and as such traps would be generally "out of sight," they would often be "out of mind."

The value of ventilation of branch-pipes, especially long branches, is so great for preventing the siphonage of traps, and for freeing such branches from bad air coming from matter left sometimes for weeks together in the pipe by inefficient flushing, that one is surprised to find so able a sanitarian as Col. Waring halting in his onward march, to put his foot down upon the vent-hole of a trap. He

is quite right in asking for the branches to be shortened, but the pipe must be made to reach the "fixture," and the fixture cannot always be kept close to the main waste. Col. Waring himself, when he favored me with a visit a year or two ago, said that his mechanical trap was of special value for fixing upon "long branches."

We know the value of trap ventilation too well in England to allow any pen, however powerful, to be put into the vent to stop it up, and no matter what trap may be used, its branch waste must be ventilated if we want perfection in sanitary plumbing.

Col. Waring says, "We must bear in mind, also, the great addition to the cost of the work that this modern hypothetical cure for bad trapping entails on the householder." I don't know the charges in America, but the ventilation of each trap to make it perfect in our English houses (by a lead pipe one-eighth or three-sixteenths thick — a pipe which could be guaranteed for half a century) would only add on an average about two pounds per thousand, in houses costing under five thousand pounds, and about one pound or thirty shillings per thousand above that price, and if this is the straw which is to break the householder's back, he can only be a "man of straw." Apologizing for the length of this letter, I remain, Sirs,

Your obedient servant,

J. Stevens Hellyer.

CHERRY STAIN.

Springfield, Mass., June 12, 1883.

To the Editors of the American Architect: —

Dear Sirs,— I enclose you a sample of cherry stained in imitation of old mahogany, and am anxious to learn the component parts of the stain, the *modus operandi* of using the stain, etc., to produce work like enclosed sample.

If you will please give particulars through the columns of your valuable paper, you will confer a favor on me and other subscribers to your paper. With much respect, I am

Yours truly, A. W. F.

[The sample enclosed seems to be an ammonia stain, finished with shellac and rubbed down. The best ammonia stain for such work is made by dissolving dragon's-blood and cochineal separately in ammonia, and applying first the dragon's-blood stain, and after this is well dried, and the work smoothed, a second coat of the cochineal solution, which will tone down the yellowish-red of the dragon's-blood to any desired extent. A thorough smoothing with sand-paper, and shellac finish will complete the work, which requires care and taste to secure a successful result.— Eds. American Architect.]

IRON FURRING-RODS FOR WIRE-LATHING.

Boston, June 20, 1883.

To the Editors of the American Architect: —

Gentlemen, — Referring to the inquiry of your correspondent headed "Iron Furring-Rods for Wire-Lathing," I would say that I used iron furrings throughout the City Hall at Providence, R. I., in 1876. The furrings consisted of small angle-irons, placed nine inches on centres, to which the wire-lathing was secured by means of screws. Samuel J. F. Thayer, Architect.

THE ORIGINAL PORTRAITS OF WASHINGTON.

Boston, June 14, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Miss Johnston has almost finished revising her book on Portraits of Washington, and will be pleased to receive any data that Mr. Charles Henry Hart can furnish; but she cannot seriously entertain a proposition to place the important task of revision in the hands of another.

NOTES AND CLIPPINGS.

Rare Iron Casks. — A cask of iron, chiselled and damascened, belonging to the Collection Rusca, was sold lately at Florence for $12,000 and a similarly wrought example for $5,000. A rectangular bas-relief, comprising two angels holding an inscribed cartel, the work of Desiderio da Settignano, realized $3,500; and a plaque of faïence, depicting the Virgin enthroned with the Child, and other figures kneeling, ascribed to Maestro Giorgio de Gubbio, sold for $2,000. — *Exchange.*

Arago's Little Joke. — One day at the Academy of Sciences they had a long and tiresome session. Arago thought he would go out and take the air. At the foot of the stairway there was a leather bowl, upon which the rays of the sun were hotly beating. Arago turned the bowl round, and, rushing up stairs, told the distinguished assemblage that he had just met with something that was very mysterious. "That leather bowl," he said, "at the foot of the stairway is cool upon the side which presents itself to the sun, but warm upon the other side." The scientists descended in a body and substantiated this assertion. They took the inclination of the sun, the hour, the minute, the second and a vast array of other details. They made calculations, and several weeks afterward each of them presented a paper explaining the phenomenon, Arago himself taking care to send in his explanation with the rest. There is no knowing how far the discussion might have gone had it not been for the doorkeeper, who, having seen Arago turn the bowl, and pitying the worthy gentlemen who were so much worried, cleared away the mystery.

Aluminum-Coated Iron. — Dr. Gehring, of Landshut, has invented a process by which ordinary iron may be rendered highly ornamental. The invention — of which, however, we have heard very little lately — of obtaining aluminum very cheaply led Dr. Gehring to coat iron with aluminum, in the same way as iron plates are now tinned, and converted into tin-plates. The inventor states that his process is inexpensive. He uses a Bunsen burner with a blast or a muffle, and is thus able to manufacture various objects of the durable metal for daily use, the coating of aluminum giving them a silver white lustre. He also produces a gold lustre or any other color, and even an enamel coating, all of which substances are said to adhere very firmly to aluminum. Aluminum, like tin, does not oxidize under normal conditions, and even stands the heat of an ordinary fire, while it is much more lustrous than tin. — *Scientific American.*

The Utilization of Sewage. — Now that they have succeeded in converting the Thames into a sewer, the people of London are commencing to think "what they are going to do about it." Sir Joseph Bazalgatte has suggested that works should be undertaken for emptying the sewage of London into the German Ocean, at a cost of $30,000,000. This proposition has been very wisely rejected, and it is now under consideration to devise some means of converting the sewage of London into manure. It is estimated that the annual output would realize 650,000 tons of excellent manure, which would materially reduce the expense of inaugurating such a system. This plan is now in successful operation in portions of France. It would be well for our cities and towns that are not satisfied (and very few of them ought or have any right to be) with their present method of disposing of sewage to seriously consider this matter. — *Medical and Surgical Reporter.*

Fire-Engine Streams and Lofty Buildings. — In commenting on our article on the "Perils of High Buildings," *The Investigator* says: "It is conceded by every competent fireman that no combination of engine power can force a stream large enough to be effective for extinguishment of a large fire, under the most favorable circumstances, higher than 75 or 80 feet at most." We think this will be news of a decidedly fresh nature to all "competent firemen," and certainly to those who are in the habit of using Siamese connections for the purpose of concentrating the power of two or more engines for the projection of one stream. But to show how absurd the statement is, here is what was done on the Brooklyn Bridge last Thursday night after the celebration. The fire-boat *Zophar Mills* was made fast to the New York tower, and two lines of hose were carried up the tower to the roadway, which is 119 feet above high water; then a line of hose was laid to the centre of the bridge, 800 feet, and two streams of water were forced up, and the bridge thoroughly washed from the centre to the New York end. At the same time, an engine of the Brooklyn Department was stationed at the foot of the Brooklyn tower, hose taken up in the same manner, and by its use the Brooklyn half of the bridge was washed. Here an engine lifted a column of water 119 feet vertically, and from that point projected it 800 feet. We grant that the capacity of an engine to throw a compact stream vertically is limited to 75 or 80 feet from the nozzle, but it can force a stream through a stand-pipe or hose to the height of 150 feet or more and still play an effective stream from a nozzle attached at that point. Commissioner Gorman, speaking on this subject, remarked that it was immaterial how high buildings are run up, provided the builders furnish them with the means whereby the firemen can obtain access to the different stories and to the roof. Stand-pipes in combination with ladders, and balconies at every story are the best and most serviceable appliances yet devised for this purpose, as they not only provide for conducting water, but are excellent as fire-escapes.—*Fireman's Journal.*

Benvenuto Cellini is perhaps the most picturesque figure in the history of art. A splendid genius, quarrelsome, envious, jealous, untrustworthy and swayed by every passing impulse, he seems to embody the very wildest of the popular theories as to the true artistic temperament. His violent passions, his mingled suppleness and audacity, his energy, his many brilliant gifts, and the perpetual play of melodramatic adventure which surrounds him with colors so shifting that they seem to prevent us from seizing the true measure of the man, combine to make of him a type which fascinates the imagination and gives a constant stimulus to curiosity. As we turn the leaves of his enchanting memoirs, we are by turns lost in admiration, surprised, made pitiful, or disgusted to loathing. The unshamed nakedness with which Cellini has set down in this book his every act, generous, mean, or brutal, his sufferings, his exploits, and his crimes, would be cynical if it were not perfectly unconscious. But it is clear, from first to last, that he was wholly free from that sense of moral responsibility which more or less fetters all civilized beings, if not in the committal, at least in the avowal of certain follies and of certain faults. A natural consequence of this temper is the atmosphere of romance and exaggeration which invests the story of his life, and which charms the reader even while it disturbs the happy credulity which be would like to bring to the reading of the memoirs. Even the best disposed have always felt a difficulty in believing Cellini's account of his extraordinary prowess when Rome was sacked by the Constable de Bourbon in 1527. According to the memoirs, it was Cellini alone who checked the advance of the troops of the Constable at the very gates of the castle of St. Angelo; it was by a shot from his hand that the Constable himself was slain and the Prince of Orange wounded. Cellini's mode of conceiving of any passing event, was, in fact, to dramatize it in his own vivid imagination, and to identify himself with the principal part. In more than one instance in the memoirs the results of this habit were so obvious that the reader began to suspect that the whole story was apocryphal, and so even the harrowing details of the two-years' imprisonment which Cellini suffered at the hands of Paul III failed to move his compassion, for he had been gradually accustomed, as M. Plon confesses, to so large a dose of exaggeration, that it was hardly possible to tell where downright lying really began. — *The Athenæum.*

BUILDING INTELLIGENCE.

(Reported for The American Architect and Building News.)

[Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.]

BUILDING PATENTS.

[Printed specifications of any patents herementioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

279,526. DOOR-HANGER. — Wilbur F. Berry, Chicago, Ill.

279,534. ADJUSTING MECHANISM FOR CALIPERS. — John J. Byrne, Chicago, Ill.

279,566. WATER-CLOSET. — Thos. Hyde, Albany, N. Y.

279,569. VALVE FOR WATER-COCKS. — Francis W. Kelly, Minneapolis, Minn.

279,600. DRIVE-WELL POINT. — Robert A. Ryrie, Camden, N. J.

279,606. DOOR-HANGER. — Ephraim L. Shaffner, Joliet, Ill.

279,611-612. HATCH-GATE FOR ELEVATORS. — William Stevens, Philadelphia, Pa.

279,628. FIRE-ESCAPE. — Samuel J. Anderson, Cazenovia, N. Y.

279,631. SASH-BALANCE. — John Bavier, Newark, N. J.

279,648. ELEVATOR. — Sidney W. Hoag, Sr., New York, N. Y.

279,655. SINK-TRAP. — John McDonald, Norwood, Mass.

279,685. BALL-COCK. — Joseph Zane, Boston., Mass.

279,721. STEAM AND WATER HEAT-RADIATING APPARATUS. — Ludwig Crusius, Kaiserslautern, Bavaria, Germany.

279,722. WRENCH. — Geo. W. Davenport, Philadelphia, Pa.

279,740. SCAFFOLD. — William A. Gillett, Union City, Pa.

279,748. METAL LATHING. — Albert R. Hancock, Lincoln, Neb.

279,749. SASH-FASTENER. — Stephen R. Harrah, Pittsburg, Kan.

279,771. SASH-FASTENER. — Jean Hilarion Lacerte, Quebec, Can.

279,774. FIRE-ESCAPE. — John Letzkus, Allegheny, Pa.

279,775. HINGE. — Homer C. Lewis, Columbus, O.

279,797. DOOR-LATCH. — Edward N. Porter, Burlington, Vt.

279,808. FLOOR-CLAMP. — Squire Raymond, East Venice, N. Y.

279,814. FIRE-ESCAPE. — Paschal P. Ripley, West Randolph, Vt.

279,817. ARTIFICIAL STONE. — William P. Rose, Irwin, Col.

279,836. BUILDING BLOCK OR BRICK. — John L. Smithmeyer, Washington, D. C.

279,837. LATCH. — William E. Sparks, New Britain, Conn.

279,838. FASTENER FOR THE MEETING-RAILS OF SASHES. — William E. Sparks, New Britain, Conn.

279,857. ADJUSTABLE HINGE. — Malcolm Campbell, Holyoke, Mass.

279,885. BENCH-PLANE. — Solon R. Rust and Arthur E. Rust, Pine Meadow, Conn.

279,897. DOOR-HANGER. — John D. Wilber, Towanda, Pa.

279,900. FIRE-ESCAPE. — Eliza Wilson, New York, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report fourteen permits have been granted, the more important of which are the following: —

John Fox, 6 four-st'y brick buildings, w s St. Paul St., commencing s w cor. Townsend St.; also, 5 three-st'y brick buildings, s s Townsend St., between St. Paul St. and Lovegrove Alley.

C. J. Bonaparte, three-st'y brick back building, s s Fayette St., between Carrollton Ave. and Carey St.

Elijah Bull, 12 three-st'y brick buildings, w s Mount St., commencing n w cor. Saratoga St.

Richard Cromwell, Jr., three-st'y brick factory, 33' x 43', n e cor. Pratt and Fremont Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Kieth's Alley*, Ward 6, for Sarah A. Robinson, 2 dwells., 22' x 27', three-st'y flat; D. Sullivan & Son, builders.

Beacon St., No. 256, rear, Ward 11, for John Howard Lee, stable, 20' x 40', one-st'y flat.

Tremont St., Nos. 1194-1198, Ward 19, for Thomas R. White, apartment-house, 50' x 70', four-st'y flat; Thomas R. White, builder.

Beacon St., near Exeter St., Ward 11, for Geo. E. Niles, dwell., 20' x 56' 6", four-st'y flat; Weston & Shepard, builders.

Albany St., No. 832, Ward 20, John M. Donovan, dwell., 23' x 44', two-st'y mansard.

West Third St., No. 11, rear of, Ward 13, for Patrick McKenna, tenement, 24' x 24', four-st'y flat; N. E. G. Sullivan, builder.

Oxford Terrace, Ward 11, for Nathan Matthews, 2 apartment-houses, 61' 6" x 114' 6", four-st'y flat; Thomas R. White, builder.

Wood. — *Heath St.*, near Heath Pl., Ward 22, for P. Do Flurin, 2 dwells., 22' x 28', three-st'y flat; Jacob Luippold, builder.

Dorchester Ave., Ward 24, for Elizabeth J. Collins, dwell. and store, 23' x 37', two-st'y pitch.

Highland Ave., near Cambridge St., Ward 25, for A. R. Gunsenhiser, 2 dwells., 14' and 20' x 50', two-st'y pitch; Henry M. Perry, builder.

West First St., No. 160, Ward 13, for J. C. Story & Co., storage, 21' x 50', one-st'y flat; J. C. Story, builder.

East Sixth St., near Q St., Ward 14, for Martin J. Gleason, shooting-gallery, 23' x 50', one-st'y pitch; James R. Colby, builder.

H St., No. 151, Ward 14, for Sarah Hanks, dwell., 18' 6" x 30', two-st'y pitch; Henry J. Morrice, builder.

Hancock St., near Florence St., Ward 23, for Henry W. Bowen, dwell., 26' and 30' x 34' 7", two-st'y pitch; W. S. Mitchell, builder.

Sheridan Ave., rear, near Chestnut Ave., Ward 23, for John Scales, stable and carriage-house, 20' x 35', two-st'y pitch; John Scales, builder.

Glen Road, near Forest Hills St., Ward 23, for Geo. C. Mann, dwell., 33' 6" x 19' 6" and 34' 6", four-st'y pitch; Samuel Beal, builder.

Frederica St., near Adams St., Ward 24, for Frederick L. Pierce, dwell., 21' x 28', two-st'y pitch; Frederick L. Pierce, builder.

Washington St., nearly opposite Roslin St., Ward 24, for Jas. A. King, wagon-shed, 17' x 69' 3" and 78', one-st'y pitch; J. F. McDonald, builder.

Dennis St., cor. Moreland St., Ward 20, for Robert M. Goode, dwell., 24' x 32', three-st'y flat; Henry J. Bartlett, builder.

Dorchester Ave., near Codman St., Ward 24, for James Reid, dwell., 22' and 27' x 32', two-st'y pitch; Constantine Pfister, builder.

Harley St., cor. Roslin St., Ward 24, for Thomas J. Hartford, dwell., 19' and 28' x 40' 3", two-st'y pitch; Nathaniel F. Berry, builder.

Edson St., near Bowdoin Ave., Ward 24, for Torrey E. Wardner, dwell., 21' and 30' x 32' 6", two-st'y pitch; Samuel T. Waters, builder.

Templeton St., near Adams St., Ward 24, for Edwin G. Bentham, 2 dwells., 13' x 30' and 13' x 15', two-st'y pitch; George Driscoll, builder.

Stanwood Ave., near Columbia St., Ward 24, for Alexander H. Clapp, dwell., 20' and 25' x 35', two-st'y pitch; Charles E. Currier, builder.

Brooklyn.

BUILDING PERMITS. — *Grand St., No.* 441, n s, 75' w Lorimer St., four-st'y brick store and tenement, tin roof; cost, $9,500; owner, David Engel, 443 Grand St.; architect, T. Engelhardt; builders, G. Lehrian & Sons and M. Metzen.

Ewen St., Nos. 13 *and* 15, w s, 25' s Varet St., 2 three-st'y brick stores and tenements, tin roofs; cost, each, $10,000; owners, Chas. Gomer's Sons, Ewen St., cor. Varet St.; architect, T. Engelhardt.; builders, J. Rauth and R. B. Ferguson.

Jefferson St., No. 78, s s, 250' e Evergreen Ave., three-st'y frame tenement, tin roof; cost, $4,000; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, T. Engelhardt.

Central Ave., w s, 50' n Jefferson St., three-st'y frame double tenement, tin roof; cost, $4,000; owner, —— Dillmann, Central Ave.; architect and builder, Henry Loeffler.

Hamilton Ave., cor. Clinton and Huntington Sts., three-st'y brick stores and tenements, tin roof; cost, $6,000; owner, T. J. Tilney, 73 Hicks St.; architect, W. Wright.

Washington St., No. 286, w s, 150' n De Kalb Ave., two-st'y brick hospital-building, tin roof; cost, $2,200; owner, Deaconess Society of L. I., on premises; architects and builders, Martin & Lee, 449 Clermont Ave.; mason, E. T. Rutan.

Quincy St., n s, 177' e Bedford Ave., 3 three-st'y brownstone front dwells., tin roofs; cost, each, $7,000; owners, B. F. Rhodes and W. S. Ray; builder, J. M. Brown.

Ewen St., s e cor. Frost St., three-st'y frame stores and double tenements, tin roofs; cost, $5,500; owner, Jno. Weis, 267 Devoe St.; architect, J. J. Smith; builders, J. Schierith and J. Rueger.

Concord St., Nos. 135 *and* 137, n s, 250' e Jay St., in rear, 3 three-st'y brick tenements, gravel roofs; cost, total, $7,000; owner and builder, W. W. Rae, 135 Concord St.; mason, J. Lock.

Throop Ave., e s, 20' s Vernon Ave., three-st'y brick tenement, tin roof; cost, $8,000; owner and builder, Louis Madn, 160 Throop Ave.; architect, M. J. Morrill; mason, J. M. Brown.

Park Pl., n s, 91' 6" w Beaver St., 7 two-st'y frame tenements, tin roofs; cost, each, $3,000; owner and builder, Geo. Loeffler, 82 Tompkins Ave.; architect, T. Engelhardt.

Lafayette Pl., n s, 150' e Broadway, 3 two-st'y frame dwells., tin roofs; cost, each, $2,000; owner, architect and builder, S. W. Post, Ridgewood; mason, —— Fardoun.

Wall St., n s, 100' e Broadway, two-st'y frame tenement, tin roof: cost, $4,300; owner, F. Hyde, 14 Wall St.; architect, F. Haimberg.

Chicago.

HOUSES. — J. M. Van Osdell, architect, is now building a house on the n w cor. of Loomis and Monroe Sts., for Mr. John Spry, two stories; cost, $40,000.

Silsbee & Kent have on hand for Mr. Potter Palmer two houses, three stories each, brownstone with Canada limestone trimmings; cost, $25,000.

FLATS. — By Silsbee & Kent, for Mr. J. V. Weaver, 213 Illinois St., three-st'y brick flat in the colonial style, to cost $8,000.

BUILDING PERMITS. — Mary E. Sands, 6 two-st'y brick dwells., 55' x 133', 715-725 Harrison St.; cost, $15,000.

Magill, Morris & Co., two-st'y basement and attic brick factory, 50' x 100'; cost, $10,000.

Mrs. C. Giles, 3 two-st'y basement dwells., 52' x 60', 416-418 Warren Ave.; cost, $15,000.

Mrs. C. Smith, two-st'y dwell., 23' x 49', 453 South Wood St.; cost, $3,000.

R. B. Mason, three-st'y dwell., 25' x 63', 27 Delaware St.; cost, $10,000.

Half Orphan Asylum, two-st'y addition, 40' x 50', 175 Burling St.; cost, $8,000.

J. Alcock, three-st'y basement flats, 24' x 70', 111 Third Ave.; cost, $7,000.

J. H. Haak, three-st'y dwell., 22' x 60', 179 Ontario St.; cost, $7,000.

J. Becker, 2 three-st'y dwells., 41' x 60', 531-541 Sedgwick St.; cost, $14,000.

A. T. Ewing, two-st'y flats, 40' x 44', 635-637 Thirteenth Pl.; cost, $4,000.

Dr. H. Johnson, two-st'y dwell., 20' x 50', 313 East Superior St.; cost, $5,800.

A. R. Fox, two-st'y flats, 40' x 55', 1144-1146 Harrison St.; cost, $6,000.

F. Crhak, three-st'y stores and flats, 22' x 54', 158 Dekoven St.; cost, $7,500.

West Chicago Gas Company, barn, 54' x 68', West Lake St.; cost, $7,000.

Wm. McCoy, seven-st'y basement and attic hotel, 95' x 108', Clark St., cor. Van Buren St.; cost, $100,000.

A. Minneciani, three-st'y basement dwell., 25' x 82', 670 Van Buren St.; cost, $12,000.

J. C. Pollock, three-st'y dwell., 25' x 62', 535 Garfield Ave.; cost, $6,500.

A. Crane, 5 cottages, each 20' x 28'; cost, $4,000.

A. Crane, 5 cottages, each 20' x 38', near Thirty-first St.; cost, $5,000.

F. Leon, 2 two-st'y dwells., 36' x 50', Fulton St.; cost, $3,500.

Wm. Foster, three-st'y store and flats, 25' x 70', 397 Van Buren St.; cost, $10,000.

H. P. Henneberry, two-st'y dwell., 22' x 66', 543 Jackson St.; cost, $8,000.

Schumacher & Tower, three-st'y basement stores and flats, 75' x 80', Twelfth St., cor. Loomis St.; cost, $20,000.

F. Hoppe, two-st'y basement flats, 22' x 52', 400 South Morgan St.; cost, $3,500.

Potter Palmer, 2 three-st'y dwells., 22' x 58' 6", State St.; cost, $14,000.

Potter Palmer, three-st'y dwell., 21' x 58' 6", State St.; cost, $14,000.

Potter Palmer, 6 two-st'y dwells., each 18' x 60', Bellevue Pl.; cost, $35,000.

J. McFarlan, two-st'y flats, 22' x 50', 154 Menominee St.; cost, $5,700.

L. McCann, two-st'y dwell., 50' x 60', 529-531 Taylor St.; cost, $6,500.

Mrs. W. Wells, three-st'y store and flats, 30' x 70', Indiana St., cor. Noble St.; cost, $8,000.

Mrs. E. Wright, three-st'y flats, 25' x 70', Park Pl.; cost, $9,000.

Matt Fraugen, three-st'y flats, 21' x 61', 41 Lincoln Pl.; cost, $5,000.

C. J. Vanzandt, two-st'y basement flats, Thirty-sixth St.; cost, $6,000.

W. E. Weigle, market-building, 50' x 160', 101-193 Canal St.; cost, $10,000.

Decker & Hulbert, 5 two-st'y dwells., 64' x 100', Adams St.; cost, $20,000.

D. Weaver Estate, 2 two-st'y dwells., 37' x 64, Adams St.; cost, $8,000.

U. P. Smith, two-st'y dwell., 30' x 50', Rhodes Ave.; cost, $9,000.

W. S. Forrest, two-st'y dwell., 30' x 50', Thirty-third St.; cost, $8,000.

H. G. Huth, two-st'y dwell., 21' x 45'; cost, $3,000.

C. L. Way, three-st'y dwell., 25' x 72'; cost, $10,000.

E. C. Knuth, two-st'y dwell., 23' x 52', 157 Fremont St.; cost, $3,000.

C. Lechtenberger, two-st'y dwell., 22' x 50', 439 Congress St.; cost, $10,000.

J. M. Allen, 13 cottages, each 20' x 40'; cost, $13,000.

D. A. Walsh, two-st'y flats, 40' x 52', 2632 Fifth St.; cost, $10,000.

F. H. Curtis, 3 two-st'y basement dwells., 31' x 60', 153-157 Twenty-fifth St.; cost, $7,500.

Cincinnati.

BUILDING PERMITS. — John Rolfs, 2 two-st'y brick buildings, Summit Ave., Price Hill; cost, $6,000.

Freiberg & Workum, two-st'y brick building, s w cor. Colorain Pike and Dayton St.; cost, $4,500.

Wm. Price, 6 two-st'y brick buildings, cor. Price St. and Grand Ave.; cost, $12,000.

Mrs. Wm. Walters, two-st'y frame building, Gilbert Ave.; cost, $3,000.

Henry Hanna, two-st'y stone front building, n s Fourth St., between Elm and Race Sts.; cost, $12,000.

Mrs. M. Meyer, 4 two-st'y brick buildings, n s York St., between Coleman St. and Western Ave.; cost, $14,000.

A. T. Ross, two-st'y frame building, Durrell Ave., near Rudolph St.; cost, $5,000.

R. B. Field, three-st'y brick building, 299 West Fifth St.; cost, $3,000.

Ten permits for repairs; cost, $9,230.

Total permits to date, 451.

Total cost to date, $1,689,450.

New York.

SUMMER Dulness is already felt in architects' offices, and new building projects are but little talked of.

APARTMENT-HOUSE. — A five-st'y apartment-house, with store on first floor, brick with stone finish, 25' x 96', is to be built on the s w cor. of Third Ave. and Eighty-ninth St., for the Wm. R. Renwick Estate, from designs of Mr. Geo. Martin Huss.

OFFICE-BUILDING. — The Western Union Company's new building, at Nos. 16 and 18 Broad St., has been placed in the hands of the contractors, Messrs. Smith & Prodgers. The building will be 48' x 88', eight stories high, first floor Belleville stone, above brick and terra-cotta; Mr. Henry J. Hardenbergh is the architect.

RESTAURANT. — A three-st'y brick restaurant, 27' x 100', is to be built on the n w cor. of Third Ave. and Seventy-second St., at a cost of about $25,000, from designs of Messrs. Henry J. Schwarzmann & Co.

STORES. — Messrs. Arnold, Constable & Co. have commenced the removal of the buildings in the rear of their present store, prior to the extension of their store.

No. 480 Pearl St. is to be rebuilt at a cost of about $20,000, from designs of Mr. Thos. R. Jackson.

BUILDING PERMITS. — *Seventy-third St.*, n w cor. Second Ave., five-st'y brownstone front tenement

and store, tin roof; cost, $20,000; owner, Abraham H. Jonas, 195 Henry St.; architect, John C. Burne.

Seventy-third St., n s, 75' w Second Ave., five-st'y brownstone front tenement and store, tin roof; cost, $12,000; owner, architect, etc., same as last.

Seventy-seventh St., s s, 175' w Second Ave., 2 five-st'y brownstone front tenements, tin roofs; cost, each, $20,000; owner, architect, etc., same as last.

One Hundred and Sixth St., s s, 100' e Ninth Ave., 2 four-st'y brick tenements, with extensions, tin roofs; cost, each, $15,000; owner, Mary C. Jackman, 28 West One Hundred and Tenth St.; architect, Ralph S. Townsend.

East Seventy-third St., *No.* 166, three and part two st'y brick stable, tin roof; cost, $25,000; owner, H. G. Marquand, 21 West Twentieth St.; architect, R. M. Hunt.

One Hundred and Seventy-third St., n s, 15 East Madison Ave., three-st'y frame dwell., tin roof; cost, $4,000; owner, Wm. B. Carman, One Hundred and Thirty-sixth St., cor. Alexander Ave.; architect, John A. Hamilton.

One Hundred and Eighteenth St., s s, 150' w Fifth Ave., one-st'y and basement brick stable, tin roof; cost, $5,000; owner, Michael Finn, 2 Sutton Pl.; architect, R. Wirth, Jr.

West Fifty-eighth St., *Nos.* 204 *to* 208, four-st'y brownstone front stable, tin roof; cost, $25,000; owner, Chas. Weeks, 225 West Fifty-eighth St.; architect, C. A. French.

Broad St., *Nos.* 16 *and* 18, eight-st'y and basement brick and stone office-building, tin and slate roof; cost, $125,000; owner, Western Union Telegraph Co., 197 Broadway; architect, H. J. Hardenbergh; builders, Smith & Prodgers.

Seventy-ninth St., s s, 325' w Ninth Ave., four-st'y brick dwell., slate and tin roof; cost, $18,000; owners, Wm. and O. Van Rensselaer, Audubon Park; architects, J. C. Cady & Co.

Seventy-third St., n s, 250' e Third Ave., 3 five-st'y brownstone front flats, tin roofs; cost, each, $20,000; owner, Anne Mulholland, 319 East Seventy-third St.; architect, J. C. Burne.

First Ave., *Nos.* 2190 *and* 2192, 2 four-st'y brick tenements and stores, tin roofs; cost, each, $10,000; owner, Gotlieb L. Koenig, 2192 First Ave.; architect, Julius Boekell.

Second Ave., n w cor. Ninety-eighth St., five-st'y brick tenement and store, tin roof; cost, $16,000; owner, Thos. Hall, 219 East Seventy-fifth St.; architect, J. H. Valentine; builder, J. O'Hare.

Second Ave., w s, 251' n Ninety-eighth St., 3 five-st'y brick tenements and stores, tin roofs; cost, each, $15,000; owner, architect and builder, same as last.

White St., *No.* 12, six-st'y brick and iron front store, tin roof; cost, $30,000; owners, Clarence A. Tucker, et al., trustees, 15 and 17 Cortland St.; architect, L. H. Broome; builders, David T. Bumstead and Chas. R. Hedden.

ALTERATIONS. — *West Thirty-seventh St.*, *No.* 142, new rear wall and internal alterations; cost, $3,400; owner, John S. Boyd, 28 West Thirty-eighth St.; architect, Elward Smith; builders, Elward Smith & Co.

Crosby St., *No.* 93, raise attic to full st'y, new flat roof, and a three-st'y brick extension; cost, $5,000; owner, Jno. C. Wilson, 104 East Seventy-eighth St.; architect, A. B. Ogden.

East Forty-first St., *No.* 15, one-st'y and basement brick extension; cost, $3,000; owner, Jas. S. Warren, 129 East Forty-second St.; architects, D. & J. Jardine.

East Forty-fourth St., *No.* 17, three-st'y brick extension; cost, $3,500; owner, Mrs. Sarah E. Hartley, on premises; architect, James Brown Lord; builders, McKenzie & McPherson.

Philadelphia.

CHURCH.—On Tioga St., near Sixteenth St., M. E. Chapel, 41' x 66', to be of stone, tile, and half-timber construction; will be erected from plans by Messrs. Hazlehurst & Huckel, architects.

On Germantown Ave., above Columbia Ave., the Congregation of Cohocksink M. E. Church propose to erect a two-st'y church-building, to be built of brownstone, 76' x 96'; cost, about $40,000.

HOUSE. — On Frankford Ave., above Church St., Dr. R. Bruce Burns proposes to erect a three-st'y house, 45' x 60', of stone and tile; also, carriage-house and stable; cost about $13,000; plans by Messrs. Hazlehurst & Huckel, architects.

WAREHOUSE. — On Letitia St., below Market St., on the site of Wm. Penn's old house, O. S. Janney & Co. are about to erect a five-st'y warehouse, 40' x 100'; A. B. Rorke, contractor.

BUILDING PERMITS. — *Hancock St.*, between Diamond St. and Susquehanna Ave., three-st'y dwell., 20' x 72'; Jno. Mitchell, contractor.

Twenty-first St., n e cor. Walnut St., five-st'y brick building, 20' x 65'; Yarnall & Cooper, contractors.

Cogshall Ave., bet. Wayne and Green Sts., three-st'y dwell., 14' x 28'; D. S. McNabb, contractor.

Fairhill St., n of Somerset St., 2 two-st'y dwells., 15' x 28'; Jno. A. Sailer, owner.

Bodine St., w s, n of Cumberland St., boiler and engine house, 19' x 60'; Jas. A. Davis, contractor.

Canal St., cor. Bank St., near Green Lane, two-st'y dwell., 18' x 32'; Jas. A. Davis, contractor.

Kensington Ave., *Nos.* 2739 *and* 2741, 2 three-st'y dwells., one with store, 18' x 50'; Jno. Cavins, contractor.

Arch St., *Nos.* 529 *and* 531, seven-st'y warehouse, 38' x 288'; Lewis Havens, contractor.

Germantown Ave., s e cor. Somerset St., three-st'y dwell., 18' x 57; two-st'y store, 20' x 32', and two-st'y stable, 16' x 20'; B. L. Collon, contractor.

Nevada St., *No.* 1129, two-st'y dwell., 16' x 42'; C. E. Duffee, owner.

Thirteenth St., s w cor. Locust St., one-st'y addition, 43' x 60'; Lewis Havens, contractor.

Musgrove St., bet. Washington and Tulpehocken Sts., two-st'y dwell., 31' x 54'; P. E. Jefferis, contractor.

Walnut Lane, cor. Wayne St., 2 three-st'y dwells., 17' x 80'; Jno. A. Decker, contractor.

Union St., bet. Murkle and Hutton Sts., 3 two-st'y dwells., 14' x 40'; W. H. Thompson.

Hamilton St., *No.* 3403, three-st'y dwell., 20' x 26'; J. S. Wilson, contractor.

Wakefield St., n e cor. Bringhurst St., 1 three-st'y and 6 two-st'y dwells., 15' x 40'; J. S. Culberton.

Green St., s of Queen St., three-st'y dwell., 36' x 49'; Wm. Garvin, contractor.

Mary St., *No.* 140, two-st'y dwell., 16' x 42'; Geo. C. Jackson, contractor.

Sansom St., *No.* 721, four-st'y store, 18' x 81'; Geo. McNichols, contractor.

Ontario St., e of Kensington Ave., two-st'y dwell., 15' x 38'; D. C. Schuler, contractor.

Filbert St., n s, w of Ninth St., fourth-st'y addition to factory, 22' x 100'; Sam'l J. Rea, contractor.

Levant St., e s, s of Pear St., fourth and fifth st'y addition to warehouse, 56' x 100'; C. D. Supplee, contractor.

Tenth St., cor. Poplar St., three-st'y brick building, 20' x 27'; E. F. Durang, architect.

Boudinot St., *No.* 2708, three-st'y store and dwell., 20' x 52'; Robert Bole, owner.

College Ave., s s, bet. Nineteenth and Twentieth Sts., one-st'y church-building, 60' x 60'; Jno. McGill, owner.

Mt. Airy Ave., 160' e of Sullivan St., three-st'y dwell., 22' x 49'; Geo. A. Leman, owner.

Warnock St., *No.* 1446, three-st'y dwell. and stable, 17' x 30'; Charles Eisle, owner.

Centre St., s s, e of Hancock St., 2 two-st'y dwells., 16' x 32'; J. K. Pierson, contractor.

Carlisle St., n w cor. Poplar St., 5 three-st'y dwells.; 18' x 49'; Jno. Doyle, contractor.

Fifth St., w s, n of Lehigh Ave., three-st'y dwell., 17' x 48'; Wm. Tecklenberg.

Tackawanna St., *No.* 4422, two-st'y dwell., 13' x 32'; Robert Shau, contractor.

Poplar St., n s, between Twenty-seventh and Twenty-eighth Sts., 2 three-st'y dwells., 18' x 30'; Jacob Rainer, owner.

West Dauphin St., *No.* 1021, three-st'y dwell., 16' x 50'; C. E. Harris.

Chestnut St., w of Thirty-sixth St., three-st'y dwell., 20' x 69'; Chas. C. Muller, contractor.

Hancock St., n of Diamond St., three-st'y dwell., 30' x 80'; also, *Sixth St.*, n e cor. Master St., four-st'y factory, 50' x 82', and two-st'y boiler-house, 30' x 50'; W. Steel, contractor.

Clearfield St., w of Richmond St., 6 two-st'y dwells., 13' x 40'; Frank Sherbick, contractor.

North Sixteenth St., *No.* 141, three-st'y dwell., 19' x 56'; J. E. & A. L. Pennock, contractors.

Sixth St., s of Cambria St., three-st'y dwell., 18' x 57'; also, on *Fifth St.*, n of Lehigh Ave., two-st'y dwell., 16' x 55'; also, at n e cor. of *Fifth St.* and Lehigh Ave., three-st'y hotel, 20' x 80'; also, on *Howard St.*, n of Diamond St., three-st'y dwell., 18' x 60'; Henry Gill, contractor.

Olney Road, e of Second St., two-st'y addition to school-house, 30' x 47'; Job Rutty, contractor.

Elm St., *Nos.* 3710 *and* 3712, 2 three-st'y dwells., 15' x 45'; W. J. Shedwick, owner.

Kensington Ave., n of Adam St., two-st'y store and dwell., 16' x 56'; Jno. McCann, owner.

North Juniper St., *No.* 225, three-st'y dwell., 16' x 48'; J. S. Steel, contractor.

Fifty-fourth St., e of Lansdowne Ave., three-st'y dwell., 16' x 30'; Chas. Christine, contractor.

Frankford Ave., cor. Adam St., two-st'y boiler-house, 20' x 40'; Marshall Bros., owners.

Sepviva St., s e cor. York St., three-st'y store and dwell., 18' x 57'; R. Beatty, contractor.

Powelton Ave., w of Forty-second St., 3 two-st'y dwells., 16' x 40'; also, on *Forty-first St.*, w of Powelton Ave., three-st'y dwell., 17' x 53'; W. Nelson West, owner.

Park St., between Twenty-first and Twenty-second Sts., 11 two-st'y dwells., 14' x 30', one with store, 18' x 40'; Joseph Thorp, owner.

Fairmount Ave., *No.* 341, three-st'y dwell., 22' x 36'; Geo. Kessler, contractor.

Kensington Ave., *No.* 2801, two-st'y store and dwell., 16' x 35'; Jno. Patton, owner.

Spring Garden St., e of Thirty-ninth St., 2 three-st'y dwells., 18' x 32'; Jno. H. Goldbeck.

Mole St., between Fifteenth and Sixteenth Sts., 9 two-st'y dwells., 15' x 36'; D. Garrison, owner.

Forty-second St., n of Viola St., 6 two-st'y dwells., 16' x 38'; R. J. Dobbins, owner.

Hancock St., e s, s of Norris St., 4 two-st'y dwells., 12' x 28'; Chas. Horn, owner.

Ingersoll St., s s, w of Twenty-third St., 8 two-st'y dwells., 13' x 41'; M. McManus, owner.

Woodstock St., w s, n of Diamond St., 14 two-st'y and 4 three-st'y dwells., 16' x 46'; Jos. N. Pattison, owner.

Cedar St., w s, between Emlen and Adam Sts., 2 two-st'y dwells., 15' x 42'; Geo. Spare, owner.

Hancock St., w s, n of Dauphin St., 3 two-st'y dwells., 15' x 42'; W. F. Shaw, owner.

Main St., s s, w of Seymour St., 4 two-st'y dwells.; W. Mackey, contractor.

Clover St., n s, between Twelfth and Thirteenth Sts., six-st'y factory, 52' x 66'; Yarnall & Cooper, contractors.

High St., e of Morton St., two-st'y dwell., 16' x 28'; Walter Boditsch, owner.

Phillips St., n of Dauphin St., 3 two-st'y dwells., 12' x 28'; Jas. McArdle, contractor.

Second St., w s, n of Dauphin St., three-st'y store and dwell., 16' x 48'; Jas. McArdle, contractor.

Leiper St., w s, above Allen St., three-st'y dwell., 28' x 59'; Wendell & Smith, contractors.

Orthodox St., w of Leiper St., 2 three-st'y dwells., 28' x 56'; Wendell & Smith, contractors.

Bickland St., w of Sixty-seventh St., 2 two-st'y dwells., 16' x 30'; Michael De Haven, owner.

Garfield St., n s, w of Wakefield St., two-st'y dwell., 16' x 40'; Wm. Garvin, contractor.

Peach St., s w cor. Media St., three-st'y dwell., 36' x 46'; J. R. Garber, contractor.

Fifteenth St., cor. Columbia Ave., n of Fifteenth St., 14 three-st'y dwells., 18' x 61'; Jos. S. Albright, owner.

Frankford Road, e s, n of Erie Ave., 2 two-st'y dwells., 16' x 38'; Barnes & Haman, contractors.

Twenty-second St., n e cor. Brown St., three-st'y addition to school-house, 34' x 50'; P. H. Somerset, contractor.

Belgrade St., w s, s of Lehigh Ave., two-st'y dwell., 14' x 26'; Duryea & Childs, contractors.

Lawrence St., e s, 40' s of Master St., three-st'y dwell., 14' x 130'; L. H. Eckard, contractor.

Nineteenth St., cor. Reed St., three-st'y school-house, 95' x 125'; W. Thompson & Bros., contractors.

River Road, between Washington and Fountain Sts., three-st'y storehouse; S. S. Kelly, contractor.

Frances St., *No.* 1731, three-st'y dwell., 20' x 62'; Stacey Reeves & Co., contractors.

Grover's Lane, Philadelphia & Reading R. R. Station, 20' x 51'; W. Kohl & Co., contractors.

Franklin St., above Columbia Ave., 4 three-st'y dwells., 17' x 58'; W. H. Bilyeu, contractor.

Tenth St., n e cor. Walnut St., four-st'y store, 25' x 60'; Marriner & Buckingham, contractors.

Eighth St., n w cor. Miflin St., four-st'y factory, 60' x 150'; J. E. & A. L. Pennock, contractors.

Fairhill St., n of York St., 2 two-st'y dwells., 16' x 40'; Samuel L. Stewart, contractor.

Market St., *No.* 919, one-st'y addition to store, 21' x 62'; Jno. Foreman, contractor.

Mechanic St., e of Morton St., 2 three-st'y dwells., 15' x 30'; McLaughlin & McNamara, contractors.

Federal St., w of Front St., two-st'y dwell., 18' x 72'; David Chambers.

Germantown Ave., n e cor. Haines St., three-st'y addition to dwell., 29' x 39'; A. B. Levis, contractor.

Cherry St., *No.* 712, sixth-st'y addition to factory, 27' x 102'; John Duncan.

Frankford Ave., n of Madison Ave., two-st'y store, 16' x 35'; Dickson Bros.

Tacony St., n w cor. Frankford St., two-st'y dwell., 18' x 30'; Thos. Waters, contractor.

Ridge Ave., n of Vineyard St., two-st'y store, 16' x 28'; P. H. Somerset.

Huntingdon St., n w cor. Hope St., five-st'y addition to factory, 38' x 88'; Wm. Simmons, contractor.

Kensington Ave., *No.* 2737, three-st'y store and dwell., 18' x 50'; H. McArdle, contractor.

Tenth St., n from Cumberland St.; 5 three-st'y dwells., four 16' x 39' and one 15' x 36'; G. H. Brinkworth.

Passyunk Road, *Nos.* 759 *and* 761, three-st'y factory, 36' x 55'; Michael McSbain.

Richmond St., n w cor. Kirkbride St., police-station, 20' x 85'; Sebastian Hern, contractor.

Fifth St., s w cor. Green St., fourth-st'y addition to storehouse, 18' x 56'; H. Koch, contractor.

Walnut St., w of Twenty-second St., 2 four-st'y dwells., 21' x 90'; Robertson & Bryan, contractors.

Girard Ave., *No.* 1715, rear, two-st'y dwell., 20' x 40'; J. R. Pile, contractor.

Lawrence St., two-st'y dwell., 16' x 44'; F. Lambrecht, contractor.

Jones St., cor. Twentieth St., addition to factory, 48' x 60'; A. Wolfington.

Snyder Ave., between Seventh and Eighth Sts., two-st'y dwell., 42' x 59'; H. W. Muloy.

North Second St., *No.* 128, fifth and sixth st'y addition to store, 26' x 166'; C. B. Porter, owner.

Montgomery Ave., between Judson and Twenty-fourth Sts., 4 three-st'y dwells., 14' x 52'; James Carn.

St. Louis.

BUILDING PERMITS. — Waters Pierce Oil Co., oil-tank; cost, $2,900.

St. Louis Mutual House Building Co., tenements; cost, $9,400; E. Mortimer, architect; Beckmeier & Rieckman, contractors.

St. Louis Mutual House Building Co., dwell.; cost, $3,600; E. Mortimer, architect; Fred Offermann, contractor.

John Westhoff, tenements; cost, $4,600; Kledus, architect; John Schafner, contractor.

Henry Frederick, tenement; cost, $2,600; Wm. Riewe, contractor.

J. P. Wilton, dwell.; cost, $8,250; Kirchner, architect; A. McAllister, contractor.

Charles H. Franke, dwell.; cost, $4,400.

Charles A. Cox & Co., pork-house; cost, $12,000; H. E. Roach, contractor.

Henry Schmidt, store and dwell.; cost, $4,500; Biermann, architect; H. C. Brinkmeyer, contractor.

Standard Theatre Co., theatre; cost, $50,000; Mcelfatrick & Son, architects; R. P. McClure, contractor.

Edward Guntly, hotel; cost, $9,400; Remmers & Thonssen, contractors.

Mrs. F. R. Smith, tenements; cost, $3,000; David Davis, contractor.

C. Neidringhous, tenements; cost, $4,200; Torwegge & Wamhoff, contractors.

H. W. Freker, tenements; cost, $3,800; C. F. May, architect; Torwegge & Wamhoff, contractors.

H. G. Biermann, dwell.; cost, $4,500; Berke, architect; Grunewald & Wind, contractors.

Rev. Chas. Ziegler, church; cost, $5,000; McNamara, architect.

Wm. Riley, dwells.; cost, $9,500; T. J. Furlong, architect; M. B. Scanlon, contractor.

S. Prag, two-st'y brick tenement; cost, $3,200; Andrew Deitz, contractor.

Gen. Wm. T. Sherman, alterations in brick dwell.; cost, $2,500; A. Cameron, architect; A. Cameron, superintendent.

Joe Mick, 2 adjacent two-st'y brick dwells.; cost, $5,000; Franz Mueller, contractor.

J. C. Ralston, 2 two-st'y brick dwells.; cost, $2,500; J. C. Ralston, contractor.

J. C. Ralston, 2 two-st'y brick dwells.; cost, $3,000; J. C. Ralston, contractor.

J. B. Ghio, 2 adjacent two-st'y brick dwells.; cost, $6,000; Grable, architect; M. L. Austin, contractor.

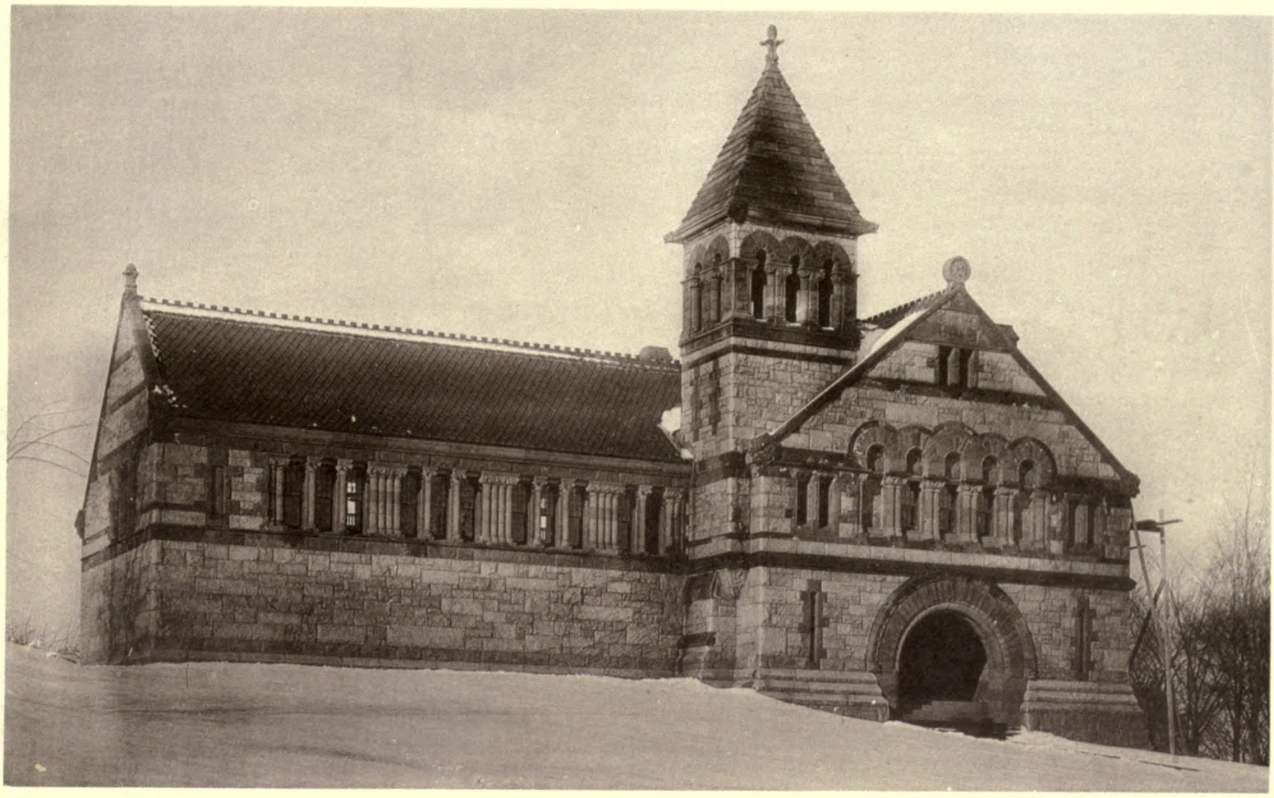
S. H. Leathe, three-st'y brick dwell.; cost, $8,000; Peabody & Stearns, architects; P. P. Furber, superintendent; sub-let.

Wm. Rime, 2 adjacent two-st'y brick dwells.; cost, $7,500; Beinke, architect; C. H. Poertner, contractor.

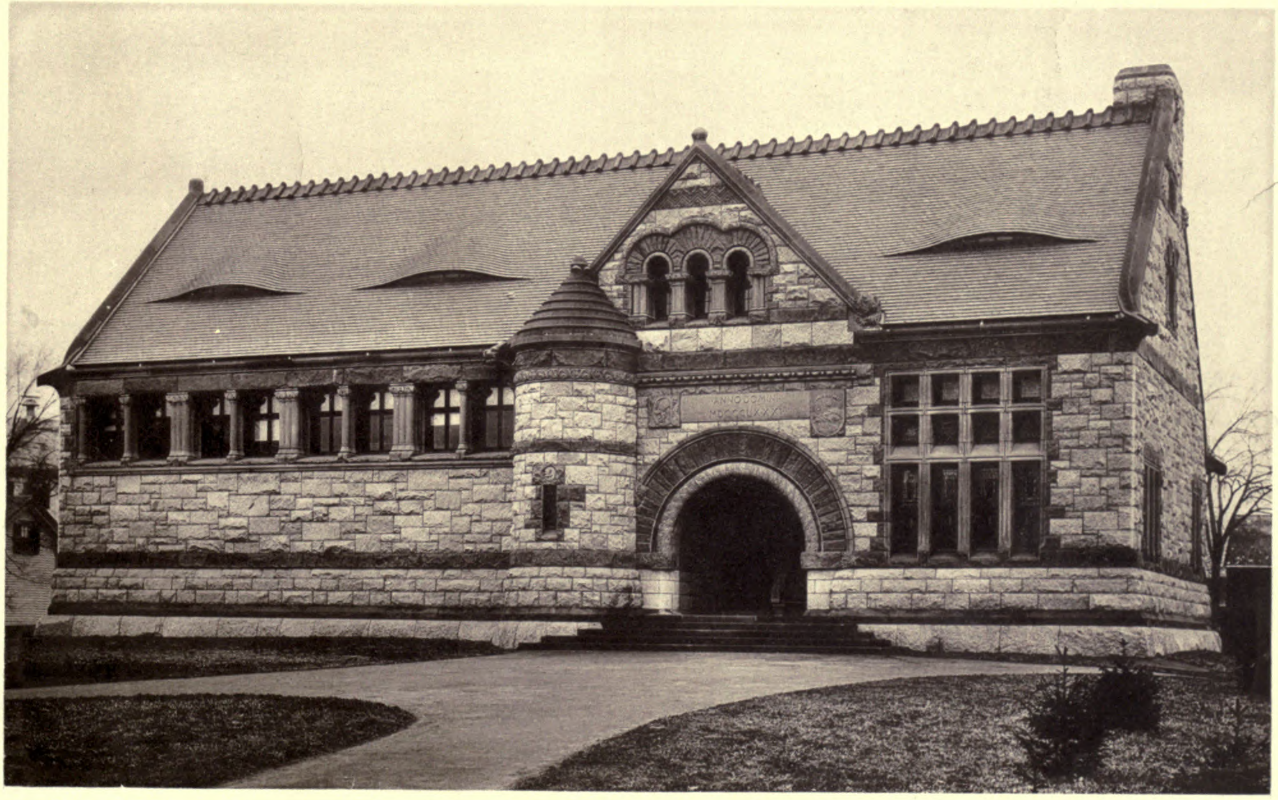
Mullanphy Board, 2 adjacent two-st'y brick dwells.; cost, $7,000; Taylor, architect; T. W. Hackett, contractor.

Wm. Riley, 2 two-st'y brick dwells.; cost, $4,500 each; Furlong, architect; M. B. Scanlan, contractor.

Rev. Charles Tiegler, addition to brick church; cost, $5,000; architect, McNamara; sub-let.



The Ames Memorial Library, North Easton, Mass.
H. H. Richardson, Architect.



The Crane Library, Quincy, Mass.
H. H. Richardson, Architect.

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